To the MOST HONORABLE THE MARQUIS OF LONDONDERRY, K.G., *Chairman, and the Members of* THE SCHOOL BOARD FOR LONDON.

In response to the direction contained in your resolution of the 24th January, 1895 :—

> "That the Medical Officer be requested to report generally on the prevalence of Diphtheria in London and elsewhere, and its alleged connection with the Elementary Schools, and further to advise what, if any, steps the Board should take in the matter,"

I have made enquiry into the subject matter thereof and beg to report as follows :—

Diphtheria is an acute specific disease of an infectious and contagious nature, manifesting itself generally, by symptoms of fever and weakness, and locally, by inflammation of the mucous membranes—particularly those of the throat and larynx—such inflammation being accompanied by a peculiar fibrinous exudation followed by abrasion and ulceration of the surface, with subsequent symptoms of paralysis, which paralysis may either be confined to the muscles of the palate or extend to those of the eye, the limbs, etc.

The disease appears to have been known in the earliest ages, for the writings of Hippocrates, Galen, Celsus and others indicate that it was recognised by them.

In England, in 1389, there was an epidemic of sore throat which carried off a large number of children, and in the district of the Rhine in 1517, there is recorded a prevalence of an unknown disease, in which the patients' tongues and throats were covered with a white fungoid growth. From this time the disease seems to have visited Spain, Portugal and Italy; in 1736 it was very prevalent in England and America, and during the years 1745–50 it not only again occurred in Portugal and Italy, but for the first time appeared in France and Holland, and again in England, especially in Cornwall and notably at Liskeard. In 1752 it was epidemic in Switzerland, Germany, and America, and later in Portugal, the north of France, Holland, Germany, America, and England. Towards the close of the 18th century there was, except in France, a marked remission which lasted for the first half of the present century when the disease again appeared on a more extended scale, but during the remission sporadic cases occurred in Great Britain; in 1840 there was an epidemic in Haverfordwest and in 1855 one at Launceston.

In 1821 a work was published by Bretonneau which gave a fuller account of this disease than had been published by any other authority, and in which many lessons are recorded drawn from his experience of an epidemic in Tours in 1818–21. It was this observer who gave the disease the name of Diphthérie, in allusion to its special power of forming membranes.

In illustration of the persistency of the disease in France, and the possibility of the transport of the virus by human agency, it may be noted that in the Crimea the French troops suffered much from Diphtheria.

According to Hirsch, a new era of prevalence of the disease began about 1857 in Europe and North America; and in England the mortality was very great in 1858–59.

From this brief outline of its history, there would appear to be no doubt that the disease has been known for many centuries, and, further, that one decided remission occurred, which was however followed by a sudden outbreak over a very greatly extended area.

In England the Registrar General has only separately abstracted Diphtheria deaths since the year 1855; up to that time the few deaths occurring were registered under the head of Scarlet Fever.

The following Table gives the death-rates per million from Diphtheria in England and Wales since 1855, and in London since 1859.

TABLE I.

Showing the death-rate per million of the population from Diphtheria in England and Wales since 1855 *and in London since* 1859 *:—*

Year.	England and Wales. — Death Rates per Million.	London. — Death Rates per Million.	Year.	England and Wales. — Death Rates per Million.	London. — Death Rates per Million.
1855	20	—	1876	129	109
1856	32	—	1877	111	88
1857	82	—	1878	140	155
1858	339	—	1879	120	155
1859	517	284	1880	109	144
1860	261	174	1881	121	172
1861	225	239	1882	152	222
1862	241	255	1883	158	244
1863	315	275	1884	186	241
1864	261	207	1885	164	227
1865	196	144	1886	149	212
1866	140	152	1887	160	235
1867	120	145	1888	171	319
1868	137	158	1889	189	391
1869	117	107	1890	179	331
1870	120	104	1891	173	340
1871	111	105	1892	222	462
1872	93	80	1893	318	760
1873	108	95	1894	292	625
1874	150	122	1895	253	529
1875	142	167			

Note.—The Infectious Diseases (Notification) Act came into operation in London in October 1889.

From the above table it will be seen that the deaths rose gradually during the years 1855, 1856, 1857, and then with a bound in the years 1858 and 1859 ; but during these latter years it should be noted that Scarlet Fever was prevalent, and there may have been some inaccuracies in diagnosis. In 1860 the mortality fell nearly one-half, and since 1881 it will be seen there has been a steady and increasing prevalence of Diphtheria in London, whereas the all England rate does not show this increase in the same marked degree.

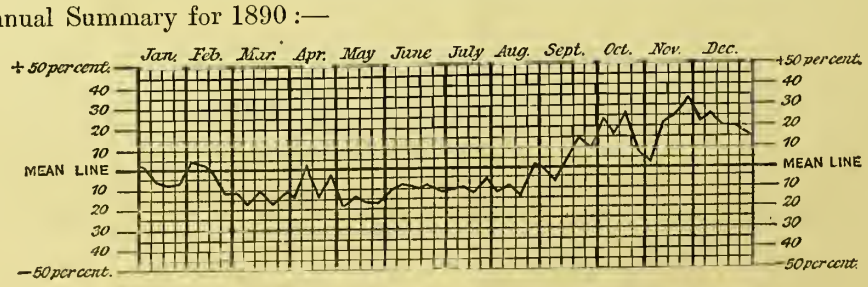
The following table gives comparatively the mortality per million of the population for several decades in England and Wales and in the Metropolis, together with that from 1891–95; the enormous increase in the London area during the periods 1881-90 and 1891–95 is most noticeable.

TABLE II.

Mortality per million of the population from Diphtheria in England and Wales and in London :—

	England and Wales. Death-rate per Million.	London. Death-rate per Million.
1861-70	185	176
1871-80	121	122
1881-90	163	260
1891-95	252	543

Diphtheria is more prevalent in temperate and cold regions than in the tropics, and in London both the mortality and the prevalence are greatest during the quarter ending December, and lowest in the quarter ending June. Hirsch has shown that the same seasonal relationship exists in Sweden, Berlin, St. Petersburg, Vienna, and Philadelphia. The London mortality is well shown by the following curve for the thirty years 1861–90, published in the Registrar General's Annual Summary for 1890 :—



It is not necessary for me to say more of the varied symptoms of Diphtheria, but it is desirable, I think, that attention should briefly be drawn to the pathology of the disease, to enable your Board to appreciate more thoroughly the conditions favourable to its spread.

The specific cause of Diphtheria is now generally admitted to be a bacillus, originally described by Klebs in 1883 as being present in the deeper layers of the affected mucous membrane, but Loeffler in the following year pointed out in more detail its connection with the disease, and showed that cultivations of the organism when injected into guinea pigs produced locally, at the site of the inoculation, changes identical with those found in the throat of man, together, subsequently, with similar general symptoms.

In 1889 Dr. Klein, in the report of the Medical Officer to the Local Government Board, carried this part of the subject still further, and it is now agreed that the organism known as the Klebs-Loeffler Bacillus and the disease stand to each other as cause and effect. It is true that other organisms are found associated with the bacillus, such as the streptococci and staphylococci of pus, and to these the secondary suppurations and inflammations of serous surfaces which so frequently arise are due. (Plate I.)

In the throat the Klebs-Loeffler Bacillus finds those conditions which are most favourable to its development, viz., a mucous membrane, a proper temperature, moisture, and a free current of air; consequently, if the bacillus obtains access to the surface every condition exists for its rapid growth and multiplication.

The bacillus is an immotile, straight, or slightly curved rod about the same length as the bacillus of tubercle but thicker; it requires for its growth a temperature of 20°C., and retains its vitality when dried, Loeffler finding it capable of development after an interval of 101 days.

These bacilli are only found at the site of the local manifestation of the disease, never in the blood, or in the organs, or in the deeper tissues, and consequently the cause of the general symptoms and complications of the disease, such as paralysis, were presumed to arise from some chemical substance produced during the growth of the organism, which substance subsequently became absorbed, through the abraded surface or otherwise, and gave rise to the local after-effects. Brieger and Frankel, Roux and Yersin, and others have cultivated this organism under favourable conditions outside the body, and they have succeeded in separating from the cultures a toxalbumin, which if injected into animals produces exactly those symptoms which are associated with the disease in man, namely paralysis, kidney disease and albuminuria, thus proving beyond all doubt that the organism is really the infective agent of the disease.

Knowing now the cause of Diphtheria to be a minute organism, and its usual site the throat, many ways will at once suggest themselves which render it easy enough to understand how the disease can be communicated either by direct or by indirect means.

In the great majority of cases, undoubtedly, the disease is transmitted by personal contact such as kissing, and the history of school or village epidemics bears strong testimony to this.

A great deal of work has been done in connection with Diphtheria, and many skilled observers have furnished reports of investigations into outbreaks, and given deductions from their observations, the value of which has been tested by later researches, and in the Milroy Lectures delivered by Dr. Thorne Thorne in 1891, an admirable epitome of the work done to that date is given.

Dr. Thorne Thorne brings important evidence to show how a waterlogged condition of the soil is favourable to the development and spread of the disease, and he lays stress upon the influence that school attendance had on its transmission in some instances. He also alludes to the large amount of ill defined throat complaints which are often associated with an epidemic of Diphtheria, and expresses the belief that attacks of so-called sore throat exhibit under certain circumstances a progressive development of infectiveness which ultimately is indistinguishable from true Diphtheria.

There is also an important memorandum by Mr. Shirley Murphy, the Medical Officer to the London County Council, dated March 8th, 1894, which, taken in conjunction with his presidential address to the Epidemiological Society in November, 1894, gives such statistical evidence of the increased incidence of Diphtheria in the school ages as to call for, as he says, further investigation into the question of the importance of "school influence."

The following is a summary of his deductions—

1. That there has been an increase in Diphtheria mortality in London at the school ages (3–10) as compared with other ages, since the Elementary Education Act became operative in 1871, as shown by the following statistical evidence :—

(*a.*) The *decrease* of Diphtheria mortality for all ages, which occurred in the decennial period 1871–1880, as compared with the decennial period 1861–1870, was *least* for the age period 3–10.

(*b.*) The *increase* in Diphtheria mortality for all ages, which occurred in the decennial period 1881–1890, as compared with the decennial period 1871–1880, was *greatest* at the age period 3–10.

(*c.*) The *increase* in the proportionate mortality in the age period 3–10 has continued during 1891–1893.

2. That an examination of the years 1861–1880 year by year, showed that the *increase* in mortality at ages 3–10, first became conspicuous in 1871, the year after the passing of the Elementary Education Act.

3. That the increased mortality from Diphtheria in populous districts as compared with rural districts since 1871, might be due to the greater effect of the Education Act in the former.

4. That there was a *diminution* of Diphtheria in London during the Summer holidays at the schools in 1893, the notifications being—

Ages.	July.	August.	September.
0 to 3 years	158	170	181
3 to 13 years	556	413	737
13 years and over	430	433	557

but that similarly prepared figures for 1892, did not show any marked changes for August.

Dr. Bruce Low, in his report to the Local Government Board on the prevalence of Diphtheria in Hastings, dated November, 1884, states that he failed to find any evidence that the disease was spread through the Elementary Schools there, although small outbreaks occurred in two private schools; nor could he trace any portion of the outbreak to contaminated milk.

In Dr. Bruce Low's Report to the Local Government Board on an outbreak in Enfield, issued in April, 1888, the transmission of the disease by a milk supply and by school attendance is a notable feature.

Dr. Sweeting, in a report to the Local Government Board, dated March, 1895, showed that in an outbreak of Diphtheria at Long Benton the number of the cases was reduced by school closure, and he considered one particular school responsible for much dissemination of the disease. And Dr. Wheaton, in a report dated March, 1895, suggests that a previous nasal catarrh may render the subject more liable to acquire or develop Diphtheria, and points out the importance of early notifications, isolations, and disinfection, to prevent the spread of Diphtheria by means of schools.

With respect to the increase of this disease in London during recent years, Dr. Sykes, the Medical Officer of Health for St. Pancras, has, in a suggestive report to the Vestry of St. Pancras, dated May, 1894, questioned how far the increase in London is real, by bringing forward statistical evidence to show that although there is a great increase in later years in the mortality from Diphtheria, there is no increase but a diminution in the mortality from other diseases of the throat, as recorded in the Registrar General's returns, and he would appear to suggest that deaths which would previously have been registered as from other diseases of the throat, have since the passing of the Infectious Disease Notification Act, been returned as from Diphtheria. Possibly this is true, but making all proper allowance, it will, I think, be clear that other influences must be at work to account for the marked increase in the incidence of Diphtheria during recent years in the metropolitan area.

I now propose, in the first place, to draw particular attention to the evidence which can be obtained from statistics bearing upon the mortality from Diphtheria in the past, so far as such statistics affect the country at large; I shall then deal more particularly with the statistical evidence available for London; and thirdly with the information which can be gathered from my own personal enquiries into more than 2,000 consecutive cases, occurring from April 1st to September 30th, 1895.

PART I.

General Evidence from Mortality of Diphtheria in England and Wales.

In the early history of the disease there is a distinctly marked tendency for the higher mortality rate to prevail in the less densely populated districts; this, Dr. Longstaff showed in a report published in 1887. The report reveals also an important change in the incidence of the disease (as judged by its mortality) in the latter periods for which the observations were made.

TABLE III.

Showing the death rates from Diphtheria according to the density of population:—

Period.	Sparse.	Medium.	Dense.
1855–1860	248	182	123
1861–1870	223	164	163
1871–1880	132	125	114

Dr. Longstaff obtained this table by grouping the registration districts of England and Wales under the headings of sparsely, medium, and densely populated, according to the relationship of the acreage to the number of the inhabitants, and, it will be seen that whereas in 1855-1860 the rate in the sparsely populated areas was more than double that in the dense districts, the rate in the decennial period 1871–1880 had markedly fallen in sparsely-populated localities, whilst it was almost at the same level as in the period 1855–60 in the more crowded parts of the country.

Not only, however, has the disease, during the period for which observations have been recorded, varied in its incidence on locality according to the density of population, but it has also varied in its incidence in England and Wales as a whole, as will be seen by a study of the next two tables (Tables IV., V.).

TABLE IV.

Mean annual rates of mortality from Diphtheria in English counties, 1861–1895.

	1861-70.	1871-80.	1881-90.	1891-5.		1861-70.	1871-80.	1881-90.	1891-5.
ENGLAND & WALES	0·18	0·12	0·16	0·25	Gloucestershire ..	0·14	0·09	0·09	0·17
					Herefordshire	0·13	0·15	0·12	0·18
London . ..	0·18	0·12	0·26	0·54	Shropshire	0·23	0·19	0·17	0·21
Surrey	0·20	0·16	0·23	0·32	Staffordshire	0·17	0·11	0·08	0·14
Kent	0·21	0·15	0·23	0·30	Worcestershire ..	0·16	0·15	0·10	0·14
Sussex	0·28	0·17	0·23	0·32	Warwickshire .. .	0·28	0·19	0·13	0·18
Hampshire . .	0·15	0·11	0·24	0·19	Leicestershire	0·12	0·10	0·10	0·25
Berkshire	0 15	0·12	0·19	0·20	Rutlandshire	0·17	0·16	0·07	0·16
Middlesex . ..	0·14	0·15	0·28	0·31	Lincolnshire	0·32	0·13	0·16	0·17
Hertfordshire	0·12	0·10	0·23	0·20	Nottinghamshire ..	0·16	0·07	0·16	0·10
Buckinghamshire ..	0·10	0·06	0·16	0·23	Derbyshire	0·16	0·08	0·09	0·15
Oxfordshire ..	0·14	0·13	0·09	0·26	Cheshire	0·23	0·17	0·12	0·22
Northamptonshire ..	0·18	0·07	0·12	0·14	Lancashire	0·16	0·12	0·15	0·19
Huntingdonshire ..	0·39	0·09	0·18	0·16	West Riding	0·16	0·09	0·11	0·15
Bedfordshire .	0·15	0·16	0·21	0·19	East Riding	0·23	0·11	0·09	0·12
Cambridgeshire	0·30	0·09	0·25	0·21	North Riding	0·24	0·12	0·10	0·14
Essex	0·22	0·13	0·27	0·51	Durham	0·13	0 09	0·08	0·18
Suffolk	0·25	0·10	0·14	0·33	Northumberland .	0·21	0·13	0·11	0·17
Norfolk	0·40	0·10	0·18	0·24	Cumberland	0·19	0·10	0·09	0·12
Wiltshire ..	0·12	0·08	0·13	0·22	Westmoreland	0·16	0·11	0·09	0·15
Dorsetshire	0·15	0·10	0·16	0·15	Monmouthshire ..	0·12	0·15	0·18	0·23
Devonshire	0·13	0·10	0·12	0·17	S. Wales	0·18	0·15	0·10	0·20
Cornwall..	0·11	0·13	0·16	0·18	N. Wales	0·29	0·20	0·17	0·19
Somersetshire	0·09	0·09	0·15	0·14					

The rates for 1871–80 are taken from the Registrar General's Decennial Supplement for 1871–80; the rates for the other periods have been calculated from the figures in his Annual and Quarterly Reports.

The figures for the period prior to 1861, have not been included in the Table, as it appears somewhat doubtful whether they belong to a period of six years or to less, and therefore trustworthy average anuual rates could not be obtained.

Looking at the figures for the whole country, a sharp fall in the rate occurred in the decade 1871–80 (which be it noted was the first decade after the establishment of Board Schools) as compared with the preceding period; in 1881–90 a rise occurred, but not sufficient to bring the rate to its level in 1861–70; but in 1891–95 a further rise occurred, bringing the mean rate for the five years to a higher figure than had been reached in any single year since 1864. Reference to Table I. will however show that the mean rate in 1861–65 was slightly higher than that in the last five years, and that the rates in the three years 1858–60 had been higher still. For the whole country then, the Diphtheria mortality in recent years has been high, but not so high as it was a generation ago.

Turning, however, to the separate counties, remarkable variations are at once apparent. It is true that the decreased mortality in the first School Board decade (1871–80) was, with a few insignificant exceptions, shared by the whole country. But not so the increase of mortality of the periods 1881–90 and 1891–95, which was very considerably greater in the southern than in the northern parts of the country. This will be well seen if a line be drawn across the map of England, starting from Yarmouth, passing north and west of Suffolk, then south of Cambridgeshire, Hunts, Northamptonshire, Warwickshire and Worcestershire, east and north of Herefordshire, and along the line separating south from north Wales. In every one of the 22 counties to the *south* of this line the Diphtheria rate was higher, either in 1881–90 or in 1891–95, than it had been in 1861–70; on the other hand, only 3 of the 23 counties to the north of the line (viz., Leicester, Lancashire and Durham) had higher rates, either in 1881–90 or in 1891–95, than they had had in 1861–70.

A convenient method of showing the *distribution* of Diphtheria through the country independently of its special severity at any time, is to represent the rates of mortality in the various counties by the proportions they bear to the rate in the whole country at the same period. Table V. has been prepared on this plan, and by its help some important facts may be at once observed. Perhaps the most significant of these facts is that certain counties have, *in each of the four periods*, had Diphtheria death-rates exceeding that for the whole country. These counties are Surrey, Kent, Sussex and Essex. The rate for one other county—Middlesex—was less than that for the whole country in 1861–70, but greater in each of the other periods.

TABLE V.

The mean annual rate of Diphtheria mortality in each county, that for England and Wales being taken as 100.

	1861-70.	1871-80.	1881-90.	1891-5.		1861-70.	1871-80.	1881-90.	1891-5.
ENGLAND & WALES	100	100	100	100	Gloucestershire ..	76	74	55	67
					Herefordshire	71	124	74	70
London	96	101	160	215	Shropshire	125	157	104	84
Surrey	109	132	141	125	Staffordshire ..	92	91	49	56
Kent	114	124	141	118	Worcestershire .	87	124	61	57
Sussex	152	141	141	125	Warwickshire	152	157	80	73
Hampshire	82	91	147	75	Leicestershire ..	65	83	61	98
Berkshire	82	99	117	79	Rutlandshire	92	132	43	62
Middlesex	76	124	172	124	Lincolnshire .. .	174	107	98	68
Hertfordshire	65	83	141	81	Nottinghamshire ..	87	58	98	39
Buckinghamshire ..	54	50	98	92	Derbyshire	87	66	55	61
Oxfordshire	76	107	55	105	Cheshire	125	141	74	87
Northamptonshire ..	98	58	74	54	Lancashire	87	99	92	75
Huntingdonshire ..	212	74	110	64	West Riding	87	74	67	60
Bedfordshire	82	132	129	76	East Riding	125	91	55	48
Cambridgeshire	163	74	153	83	North Riding	130	99	61	56
Essex	120	107	166	201	Durham	71	74	49	70
Suffolk	136	83	86	129	Northumberland ..	114	107	67	67
Norfolk	217	83	110	97	Cumberland	103	83	55	46
Wiltshire	65	66	80	89	Westmoreland	87	91	55	61
Dorsetshire	82	83	98	58	Monmouthshire ..	65	124	110	90
Devonshire ..	71	83	74	69	S. Wales	98	124	61	81
Cornwall	60	107	98	73	N. Wales	158	165	104	75
Somersetshire	49	74	92	55					

The results shown in Tables IV. and V. are well combined in the accompanying four maps. (Plates II. to V.) In them the actual Diphtheria death-rate is shown in figures under the name of

each county, and the counties whose rates differed by more than 10 per cent. from that of the whole country are coloured yellow or blue; shades of yellow indicating degrees of excessive Diphtheria mortality, and shades of blue indicating relative freedom from the disease. In each case the deeper shade shows the greater departure from the average.

If, with the aid of these maps, we attempt to trace the spread of Diphtheria in the south-eastern corner of England, we find that in 1861–70 London, with a rate slightly less than that of the entire country, was partly surrounded (on the east and south) by counties whose Diphtheria mortality was relatively high. In 1871–80, the mortality in London still remained practically equal to that of England and Wales (which had fallen by one-third), but the ring of relatively Diphtheritic counties had become complete around it, and in the two following periods the mortality in London itself increased enormously. Another point which is clearly brought out is that, although the death-rates from Diphtheria in several of the northern counties exceeded the rate in the whole country in 1861–70 and 1871–80, the excessive mortality has, during the later periods, been (with one small exception, viz. Monmouthshire in 1881-90) entirely confined to the south-eastern part of the country.

A general statement that the *southern counties* of England have suffered their highest Diphtheria rates since 1881, and that the *midland* and *northern counties* (excepting Leicester, Lancashire, and Durham) had suffered theirs before 1871, is very near the truth—and it must be noted that this southern area includes, not only London and the immediately surrounding counties, but a number of agricultural counties, which cannot by any stretch of the imagination be supposed to be constantly infected from London. And on the other hand the northern area of low Diphtheritic rates since 1871 comprises thickly populated towns and congeries of towns, in which all the influences of mere aggregation (school or otherwise) in the spread of the disease are likely to be as active as in London, and *far more active* than in such agricultural districts as Bucks, Oxfordshire, Suffolk and Wilts, counties whose recent Diphtheria rates exceed those shown in any of the four periods in Lancashire.

Through the kindness of Dr. Thresh, the Medical Officer of Health for the County of Essex, I am enabled to add further details relative to the prevalence of Diphtheria in Essex, which in Plate V., 1891–95, is seen to be allied to London, and which will be illustrated by a reference to the accompanying maps.* (Plate VI.)

In a report published in 1889, Dr. Thresh drew particular attention to the fact that the mortality rate of Diphtheria in Essex was very high, and he went on to show that the local incidence of the disease revealed some important facts; *e.g.*, Chelmsford, which in the years 1871–78 had a high rate of mortality from this cause, was shown to have a greatly decreased rate in 1879–88, Braintree and Saffron Walden being the only other districts showing a decrease, whilst in some of the districts the increase was enormous; again, in 1889–95 the increase in the incidence will be found particularly in Orsett and West Ham. The increase is in the Southern and Midland districts, along the coast and the river.

TABLE VI.

Giving the mean death rates from Diphtheria per 10.000 *of the population in various districts of Essex.*

District.	Mean for 1871-78.	Mean for 1879-88.	Mean for 1889-95.
Billericay	·93	4·08	1·80
Halstead	·80	3·32	2·96
Epping	1·20	3·35	3·11
West Ham	·91	3·02	5·17
Orsett	1·81	3·48	6.85
Compare these with the following Districts:—			
Saffron Walden	1·30	1·03	2·70
Braintree	2·25	1·63	2·00
Chelmsford	3·65	2·62	2·92

*Note.—The incidence of Diphtheria is differently shown in these maps, *gradation* of shading not being employed.

The following points are interesting in this connection :—

1. The enormous increase in the death rate per 10,000 of the inhabitants from Diphtheria in this county.

1871–78	1·30
1879–88	2·64
1889–95	4·43

2. That during the past seven years there has been a decrease in the incidence of Diphtheria in 4 districts and an increase in 12.

3. The following gives the death rates from Diphtheria and the nature of the district :—

Typical Districts.	1871–78.	1879–88.	1889–95.
Billericay (entirely rural) ..	·93	4·08	1·8
Ongar do. ..	·6	1·62	4·46
Romford (urban)	·92	2·56	6·45
Rochford (chiefly rural) ..	1·0	1·19	4·95
Colchester (urban)	1·35	1·48	1·65

These typical districts show that whether they are purely urban, or purely rural, or both, there has been a marked tendency for the disease to increase; if school influence is a marked factor why should Ongar, a purely rural district, have a greatly increased incidence, and Colchester but slight.

In the hope of throwing an indirect light on the problem, the mortality from Measles and from Scarlet Fever in the English counties in the three decennia 1861–70, 1871–80, and 1881-90, and in the five year period 1891-95 has been calculated.

TABLE VII.

Death rates per 1,000 *living from Measles*, 1861–95.

	1861-70.	1871-80.	1881-90.	1891-95.		1861-70.	1871-80.	1881-90.	1891-95.
ENGLAND & WALES	·44	·38	·44	·41	Gloucestershire ..	·38	·33	·36	·29
					Herefordshire	·16	·16	·24	·12
London	·57	·51	·63	·59	Shropshire ..	·28	·19	·18	·17
Surrey	·34	·26	·27	·24	Staffordshire ..	·58	·40	·51	·49
Kent	·32	·23	27	·24	Worcestershire ..	·33	·26	·36	·25
Sussex	·24	·17	·23	·23	Warwickshire ..	·52	·34	·44	·36
Hampshire	·30	·28	·29	·34	Leicestershire	·50	·39	·34	·38
Berkshire	·28	·24	·28	·24	Rutlandshire	·25	·16	·18	·07
Middlesex	·33	·32	·39	·29	Lincolnshire	20	·18	·17	·15
Hertfordshire	·28	·26	·31	·23	Nottinghamshire ..	·36	·30	·35	·36
Buckinghamshire ..	·31	·27	·32	·29	Derbyshire	·39	·37	·39	·29
Oxfordshire .. .	·28	·20	·29	·23	Cheshire	·47	·38	·44	·35
Northamptonshire ..	·48	·33	·37	36	Lancashire ..	·69	·61	·71	·56
Huntingdonshire ..	·29	·14	·17	·09	West Riding	·49	·39	·42	·43
Bedfordshire . ..	·31	·23	·27	·24	East Riding	·31	·27	·27	·31
Cambridgeshire.. ..	·34	·21	·22	·15	North Riding	·25	·25	·26	·23
Essex	·27	·22	·37	·56	Durham .. .	·47	·41	·47	·51
Suffolk	·23	·14	·22	·19	Northumberland ..	·37	·28	·42	·45
Norfolk	·25	·15	·20	·17	Cumberland	·45	·44	·44	·52
Wiltshire	·32	·21	·22	·21	Westmoreland	·21	·19	·13	·23
Dorsetshire	·27	·20	·25	·16	Monmouthshire ..	·48	·57	·52	·58
Devonshire	·43	·50	·35	·32	South Wales	·33	·39	·42	·41
Cornwall	·46	·23	·27	·21	North Wales	·22	·25	·22	·20
Somersetshire	·30	·27	·31	·31					

From this table it will be seen that generally speaking the mortality from Measles, like that from Diphtheria, declined in the decade 1871–80, and rose in 1881–90. Only four counties (Devonshire, Monmouthshire, and North and South Wales) showed *greater* mortality in 1871-80 than in the previous decade; and only eight (the four just enumerated, with Shropshire, Leicestershire, Lincolnshire, and Westmoreland) showed less mortality in 1881–90 than in 1871–80.

In the same way as in the case of Diphtheria with the view of showing the distribution of Measles through the country, independently of its special severity at any time, Table VIII. has been prepared, in which the rate for all England is taken as 100, and those for the counties compared on this basis.

TABLE VIII.

Relative Geographical Distribution of Measles, 1861–95.

	1861-70.	1871-80.	1881-90.	1891-95.		1861-70.	1871-80.	1881-90.	1891-95.
ENGLAND & WALES	100	100	100	100	Gloucestershire ..	86	87	82	71
					Herefordshire	36	42	55	30
London	130	134	143	147	Shropshire ..	64	50	41	41
Surrey	77	68	61	59	Staffordshire	132	105	116	121
Kent	73	60	61	59	Worcestershire. ..	75	68	82	63
Sussex	55	45	52	56	Warwickshire	118	89	100	89
Hampshire	68	74	66	85	Leicestershire	114	103	77	95
Berkshire	64	63	64	58	Rutlandshire	57	42	41	18
Middlesex ..	75	84	89	71	Lincolnshire	45	47	39	37
Hertfordshire	64	68	70	56	Nottinghamshire ..	89	97	89	72
Buckinghamshire ..	70	71	73	73	Derbyshire	82	79	80	89
Oxfordshire	64	53	66	56	Cheshire	107	100	100	87
Northamptonshire ..	109	87	84	90	Lancashire	157	160	161	139
Huntingdonshire ..	66	37	39	23	West Riding	111	103	95	107
Bedfordshire . ..	70	60	61	59	East Riding	70	71	61	77
Cambridgeshire.. .	77	55	50	38	North Riding . ..	57	66	59	57
Essex	61	58	84	139	Durham	107	108	107	126
Suffolk	57	39	45	41	Northumberland ..	84	74	95	112
Norfolk	52	37	50	48	Cumberland	102	116	100	128
Wiltshire	73	55	50	51	Westmoreland	47	50	30	56
Dorsetshire	61	53	57	39	Monmouthshire ..	109	150	116	142
Devonshire	98	132	80	78	South Wales	75	103	95	102
Cornwall	105	60	61	51	North Wales	50	66	50	49
Somersetshire	68	71	70	76					

When, however, we inquire more closely into the matter, we find a remarkable difference of behaviour between Diphtheria and Measles. The mortality in certain counties was greater than in the country as a whole during each of the four periods. These counties were London, Monmouthshire, Staffordshire, Lancashire, Durham, and Cumberland. The relative freedom of the southern counties from Measles is as remarkable as the liability of several of them to Diphtheria. The Measles rate in Northamptonshire and in Cornwall exceeded the rate in England and Wales during 1861–70, the rate in Devonshire was excessive in 1871–80, and that in Essex in 1891–95; but these are the only cases in which the rate in any southern county except London has exceeded the rate for the whole country in *any one* of the four periods. A comparison of the accompanying maps (Plates VII.–X.) with those for Diphtheria will show clearly the contrast between the local distributions of Measles and of Diphtheria.

Applying the same line of reasoning in the case of Scarlet Fever, we have in the first place the death rates per 1,000 living for the years 1861–95.

TABLE IX.

Death rates per 1,000 *living from Scarlet Fever*, 1861–95.

	1861-70.	1871-80.	1881-90.	1891-95.		1861-70.	1871-80.	1881-90.	1891-95.
ENGLAND & WALES	·97	·72	·33	·18	Gloucestershire ..	·88	·49	·29	·12
					Herefordshire	·58	·35	·20	·17
London	1·14	·60	·33	·24	Shropshire	·55	·52	·20	·13
Surrey	·78	·27	·12	·06	Staffordshire	1·06	1·01	·36	·21
Kent	·74	·34	·14	·08	Worcestershire.. ..	·94	·71	·25	·09
Sussex	·57	·23	·12	·04	Warwickshire	1·01	·86	·29	·15
Hampshire	·71	·37	·10	·08	Leicestershire	·57	·62	·38	·20
Berkshire	·67	·32	·15	·08	Rutlandshire	·87	·49	·17	·03
Middlesex	·79	·33	·18	·12	Lincolnshire	·70	·51	·31	·10
Hertfordshire	·76	·31	·16	·06	Nottinghamshire ..	·80	·64	·43	·21
Buckinghamshire ..	·71	·35	·18	·07	Derbyshire	·81	·79	·36	·14
Oxfordshire	·56	·38	·19	·09	Cheshire	·99	·87	·29	·16
Northamptonshire ..	·91	·40	·26	·11	Lancashire	1·36	1·13	·48	·28
Huntingdonshire ..	·55	·44	·14	·07	West Riding	1·11	1·03	·53	·20
Bedfordshire	·69	·48	·27	·11	East Riding	1·08	·51	·51	·12
Cambridgeshire.. ..	·58	·25	·21	·04	North Riding	·91	·67	·34	·11
Essex	·74	·42	·22	·19	Durham	1·62	1·38	·51	·19
Suffolk	·66	·46	·16	·10	Northumberland ..	1·38	1·15	·35	·17
Norfolk	·60	·33	·10	·07	Cumberland	·89	·82	·23	·22
Wiltshire	·60	·47	·12	·10	Westmoreland	·51	·42	·11	·12
Dorsetshire	·68	·33	·11	·09	Monmouthshire ..	1·04	·69	·51	·36
Devonshire	·59	·34	·19	·14	South Wales	·98	·86	·55	·29
Cornwall	·84	·59	·17	·22	North Wales	·76	·70	·26	·17
Somersetshire	·67	·47	·18	·15					

And here it is to be noted that the changes in Scarlet Fever mortality have been altogether of another kind. Table IX. shows that the tendency throughout the country has been towards a

rapid and continuous decline. In the country as a whole, the mortality in 1891–95 was less than one-fifth of what it had been in 1861–70, and every single county shows a much lower rate in 1891–95 than in 1861–70. Indeed, only four counties fail to show a *successive* decline of mortality in the four periods, covered by the table; and these exceptions are too small to be of real importance. Table X. has been prepared to show, as before described, the relative geographical distribution of Scarlet Fever in England and Wales.

TABLE X.

Relative Geographical Distribution of Scarlet Fever, 1861-95.

	1861-70.	1871-80.	1881-90.	1891-95.		1861-70.	1871-80.	1881-90.	1891-95.
ENGLAND & WALES	100	100	100	100	Gloucestershire ..	91	68	88	65
					Herefordshire	60	49	61	93
London	118	83	100	133	Shropshire	57	72	61	73
Surrey	80	38	36	32	Staffordshire .	109	140	109	116
Kent	76	47	42	46	Worcestershire.. ..	97	99	76	47
Sussex	59	32	36	25	Warwickshire	104	120	88	83
Hampshire	73	51	30	42	Leicestershire	59	86	115	108
Berkshire	69	44	45	43	Rutlandshire	90	68	52	15
Middlesex	81	46	55	65	Lincolnshire	72	71	64	56
Hertfordshire	78	43	48	35	Nottinghamshire ..	82	89	130	117
Buckinghamshire ..	73	49	55	40	Derbyshire	84	110	109	75
Oxfordshire	58	53	58	47	Cheshire	102	121	88	90
Northamptonshire ..	94	56	79	58	Lancashire	140	157	145	151
Huntingdonshire	57	61	42	38	West Riding ..	114	114	161	111
Bedfordshire	71	67	82	62	East Riding . ..	111	71	155	65
Cambridgeshire.. ..	60	35	64	23	North Riding	94	93	103	62
Essex	76	58	67	107	Durham	167	192	155	107
Suffolk	62	46	30	41	Northumberland ..	142	160	106	95
Norfolk	68	64	48	53	Cumberland	92	114	70	122
Wiltshire	62	65	36	53	Westmoreland .. .	53	58	33	64
Dorsetshire	70	46	33	51	Monmouthshire .	107	96	155	200
Devonshire	61	47	58	79	South Wales	101	120	167	162
Cornwall.. .. .	87	82	52	118	North Wales	78	97	79	96
Somersetshire .. .	69	65	55	82					

From this Table it is seen that Staffordshire, Lancashire, The West Riding, Durham, and South Wales, were in excess in each period, and Northumberland and Monmouthshire in three periods out of the four. It will be noted that Staffordshire, Lancashire, Durham, and Monmouthshire occupy a similar unhappy pre-eminence in regard to Measles also; while on the other hand Staffordshire, Lancashire and Durham are among the counties whose Diphtheria rates have in each period been below those of the whole country. The similarity of the local distributions of Measles and Scarlet Fever, and their contrast with the local distribution of Diphtheria, will be still more clearly seen by an examination of the accompanying maps (Plates XI.—XIV.) and by comparing them with those relating to Diphtheria and Measles.

The general result of such an examination appears to be that, although the spread of every infectious disease must necessarily be favoured by bringing together large numbers of those most liable to it, yet the conditions most favourable to the diffusion of Measles and Scarlet Fever, are not those most favourable to the diffusion of Diphtheria. In other words, if we wish to explain why Sussex is comparatively free from Measles and Scarlet Fever, but suffers from excessive Diphtheria mortality, while Staffordshire is comparatively free from Diphtheria but suffers excessively from Measles and Scarlet Fever, we must look for some conditions which are not common to the two counties.

It may be suggested that such a condition is found in the fact that Sussex is much nearer to London than is Staffordshire; but this suggestion fails entirely to meet the case, since the special liability of Sussex to Diphtheria began several years before that of London. If school infection is the chief cause of the mortality from Diphtheria in Sussex, why should Staffordshire escape? And, if school infection is the chief factor in the spread of Measles and Scarlet Fever in Staffordshire, why should Sussex escape? It is evident, that several agencies must be at work in spreading zymotic diseases among children, and it may be taken as highly probable that school infection is one of those agencies. But the comparison of the geographical distributions of three of these diseases strongly suggests that some local causes other than school attendance have a more potent influence in selecting the disease and promoting its diffusion.

PART II.

SECTION A.

London School Attendance, Notifications, Mortality, and Sex Influence.

Having now shown that the theory of school influence is inadequate to explain the changes in the incidence of Diphtheria through the country in the last quarter of a century, we have now to consider in detail the case of London.

In the following Table, the average attendances at Elementary Schools in London are shown for each year since 1871, and in the next column the estimated population at the ages 3–13 for the same year is given. In the last column the percentage of the population at ages 3–13 attending Elementary Schools to the total population at those ages is seen.

TABLE XI.

Showing the proportion of the population of School ages (3–13) *attending Elementary Schools in London for each year since* 1871.

Year.	Voluntary Schools. Average Attendance.	Board Schools. Average Attendance.	Total Average Attendance at School.	Estimated Population at School Ages (3—13).	Percentage Population attending Elementary Schools.
1871	173,406	895	174,301	703,110	24·8
1872	165,482	19,421	184,903	715,466	25·8
1873	195,662	40,481	236,143	728,036	32·4
1874	199,613	73,853	273,466	740,829	36·9
1875	196,851	91,646	288,497	753,843	38·2
1876	199,605	114,380	313,985	767,088	40·9
1877	190,163	146,155	336,318	780,558	43·1
1878	184,607	165,900	350,507	794,266	44·1
1879	182,728	185,518	368,246	808,212	45·5
1880	181,649	200,694	382,343	822,403	46·5
1881	177,438	220,068	397,506	835,144	47·6
1882	174,723	238,205	412,928	842,066	49·0
1883	173,845	266,013	439,858	849,044	51·8
1884	169,011	278,224	447,235	856,077	52·2
1885	167,242	298,317	465,559	863,166	53·9
1886	163,477	305,715	477,192	870,312	53·7
1887	165,099	319,443	484,542	877,514	55·2
1888	162,349	328,578	490,927	884,774	55·5
1889	164,770	342,321	507,091	892,091	56·8
1890	164,434	345,746	510,180	899,466	56·7
1891	162,525	347,857	510,382	907,273	56·2
1892	165,050	362,585	527,635	916,276	57·6
1893	174,035	379,445	553,480	925,368	59·8
1894	177,579	390,812	568,391	934,551	60·8

In the next Table (Table XII.) the percentage of children 3 13 attending school is placed side by side with the comparative death rates of children at ages 3–10 for same years. It will be seen that while the percentage of children attending Elementary Schools has largely increased, viz., from 24·8 per cent. in 1871 to 59·8 per cent. in 1893, the comparative death rate at ages 3–10 has remained throughout these years fairly constant, the lowest proportion having been 312 in 1875, the highest 369 in 1881, and the average for the 24 years 347.

TABLE XII.

Comparing the percentage attendance of the population of School age in London at Elementary Schools with the comparative incidence of Diphtheria on School ages since 1871.

Year.	Death rate at ages 3-10 (that at all ages being taken as 100.)	Percentage Population of school ages attending Elementary Schools.	Year.	Death rate at ages 3-10 (that at all ages being taken as 100.)	Percentage Population of school ages attending Elementary Schools.
1871	335	24·8	1883	342	51·8
1872	341	25·8	1884	341	52·2
1873	320	32·4	1885	344	53·9
1874	314	36·9	1886	361	53·7
875	312	38·2	1887	345	55·2
1876	337	40·9	1888	366	55·5
1877	326	43·1	1889	357	56·8
1878	352	44·1	1890	351	56·7
1879	357	45·5	1891	368	56·2
1880	345	46·5	1892	354	57·6
1881	369	47·6	1893	362	59·88
1882	366	49·0	1894	357	60·

TABLES XIII. to XVII.

Showing the prevalence of the disease in each sanitary area for every year since notification has been compulsory. The sanitary areas are arranged in the order of the severity of the disease.

TABLE XIII.

Diphtheria Incidence in London in the Year 1891.

(Sanitary Areas arranged in order of Incidence.)

Sanitary Area.	Enumerated Population (un-revised).	Notifications.	Rate per 1,000.	Sanitary Area.	Enumerated Population (un-revised).	Notifications.	Rate per 1,000.
Hammersmith	97,237	284	2·92	Camberwell	235,312	233	·99
Poplar	166,697	441	2·65	Marylebone	142,381	139	·98
Islington	319,433	696	2·18	Mile End	107,565	104	·97
Bethnal Green	129,134	277	2·15	Holborn	33,248	31	·93
Whitechapel	74,462	155	2·08	Greenwich	165,417	151	·91
Battersea	150,458	310	2·06	St. George's, Southwark	59,712	53	·89
St. George's-in-the-East	45,546	89	1·95	Bermondsey	84,688	76	·89
Clerkenwell	65,885	121	1·84	Westminster	55,760	49	·88
Chelsea	96,252	173	1·80	Newington	115,663	98	·85
Hackney	229,531	392	1·71	City of London	38,345	32	·83
Shoreditch	124,009	212	1·71	Rotherhithe	39,074	32	·82
Paddington	117,838	180	1·53	St. James', Westminster	24,993	19	·76
Hampstead	68,425	101	1·48	Lewisham	72,272	54	·75
St. Luke's	42,411	59	1·39	Fulham	91,640	69	·71
St. Pancras	234,437	295	1·26	St. Giles	39,778	25	·63
St. Saviour, Southwark	27,162	34	1·25	Plumstead	88,539	54	·61
Lambeth	275,202	334	1·21	St. Olave, Southwark	12,694	7	·55
Limehouse	57,599	68	1·18	Strand	25,201	11	·44
Kensington	166,321	185	1·11	St. Martin	14,574	4	·27
Wandsworth	156,931	170	1·08	Woolwich	40,848	8	·20
St. George, Hanover Square	78,362	81	1·03	LONDON	**4,211,743**	**5,991**	**1·42**

TABLE XIV.

Diphtheria Incidence in London in the Year 1892.

(Sanitary Areas arranged in order of Incidence.)

Sanitary Area.	Enumerated Population.	Notifications.	Rate per 1,000.	Sanitary Area.	Enumerated Population.	Notifications.	Rate per 1,000.
Bethnal Green	129,132	532	4·12	Marylebone	142,404	218	1·53
Whitechapel	74,462	242	3·25	Wandsworth	156,942	239	1·52
Hammersmith	97,239	312	2·75	St. Giles	39,782	60	1·51
St. George's-in-the-East	45,795	126	2·75	St. Saviour, Southwark	27,177	39	1·44
Lewisham	72,272	123	2·70	Paddington	117,846	168	1·43
Hackney	229,542	617	2·69	Plumstead	88,539	124	1·40
Poplar	166,748	436	2·62	Limehouse	57,376	80	1·39
Westminster	55,774	138	2·57	Newington	115,804	151	1·30
City of London	38,320	91	2·47	St. Olave	12,723	16	1·26
Battersea	150,558	353	2·34	St. George's, Southwark	59,712	74	1·24
Mile End	107,592	249	2·31	Camberwell	235,344	281	1·20
Islington	319,143	709	2·22	Strand	25,217	28	1·11
Hampstead	68,416	129	1·89	Rotherhithe	39,255	43	1·09
Holborn	33,264	61	1·83	Bermondsey	84,682	89	1·05
Lambeth	275,203	491	1·80	St. James', Westminster	24,995	26	1·04
Chelsea	96,253	167	1·74	Greenwich	165,413	173	1·04
St. Pancras	234,379	408	1·74	Kensington	166,308	172	1·04
Clerkenwell	66,216	114	1·72	Fulham	91,639	94	1·03
St. Martin's	14,616	25	1·71	St. Luke's	42,440	42	·99
Shoreditch	124,009	202	1.63	Woolwich	40,848	16	·39
St. George's, Hanover Square	78,364	122	1·56	LONDON	**4,211,743**	**7,792**	**1·85**

TABLE XV.

Diphtheria Incidence in London in the Year 1893.

(Sanitary Areas arranged in order of Incidence.)

Sanitary Area.	Estimated Population.	Notifications.	Rate per 1,000.	Sanitary Area.	Estimated Population.	Notifications.	Rate per 1,000.
Poplar	169,141	1,103	6·52	Islington	327,919	863	2·63
Bethnal Green	129,620	708	5·46	Lewisham	77,473	201	2·59
St. George's-in-the-East	45,493	234	5·14	Rotherhithe	40,020	100	2·50
Clerkenwell	65,589	279	4·25	Wandsworth	172,143	416	2·42
Limehouse	57,115	229	4·01	Bermondsey	84,246	206	2·40
Shoreditch	123,440	484	3·92	St. Olave	12,903	31	2·40
Battersea	158,105	625	3·90	Paddington	120,421	279	2·32
Newington	117,672	454	3·86	Chelsea	98,182	227	2·31
Hackney	240,584	921	3·83	Plumstead	94,596	216	2·28
St. Luke's	41,577	145	3·48	Fulham	104,735	231	2·21
St. Pancras	233,936	763	3·27	Hampstead	73,380	161	2·20
St. Saviour, Southwark	26,854	85	3·17	Kensington	167,029	358	2·14
Mile End	108,041	343	3·17	Camberwell	245,143	490	2·00
Strand	23,788	74	3·11	St. James', Westminster	24,000	46	1·92
St. George's, Southwark	59,953	175	2·92	St. Giles	38,641	73	1·90
Holborn	32,690	95	2·91	City of London	35,870	65	1·81
Lambeth	280,284	770	2·75	St. Martin's	14,034	25	1·78
Marylebone	139,726	384	2·75	St. George's, Hanover Square	76,043	116	1·53
Greenwich	174,120	469	2·74	Westminster	54,829	81	1·48
Whitechapel	75,178	202	2·67	Woolwich	41,854	26	·62
Hammersmith	103,044	273	2·65	LONDON	**4,306,411**	**13,024**	**3·02**

TABLE XVI.

Diphtheria Incidence in London in the Year 1894.

(Sanitary Areas arranged in order of Incidence.)

Sanitary Area.	Estimated Population.	Notifications.	Rate per 1,000.	Sanitary Area.	Estimated Population.	Notifications.	Rate per 1,000.
St. George's-in-the-East	45,360	197	4·33	St. Olave, Southwark	12,984	28	2·17
Bethnal Green	129,840	508	3·92	Lambeth	282,574	588	2·13
Poplar	170,217	639	3·72	St. Pancras	233,739	506	2·12
Rotherhithe	40,365	144	3·60	Holborn	32,438	68	2·02
Greenwich	173,128	562	3·28	Marylebone	138,554	274	1·96
Limehouse	57,000	183	3·20	Wandsworth	179,518	326	1·92
St. Saviour, Southwark	26,712	84	3·20	Lewisham	79,903	149	1·92
Fulham	110,993	330	3·15	Hammersmith	105,696	179	1·74
Paddington	121,583	374	3·11	Plumstead	59,233	111	1·66
Bermondsey	84,053	259	3·07	Kensington	167,350	269	1·61
Mile End	108,242	327	3·03	St. James', Westminster	23,517	40	1·50
Battersea	161,558	468	2·95	St. Luke's	41,168	60	1·44
St. George's, Southwark	60,060	177	2·95	St. George's, Hanover Square	75,033	103	1·37
Camberwell	248,893	697	2·84	Westminster	54,414	73	1·33
Islington	331,900	859	2·62	Hampstead	75,443	95	1·29
Newington	118,512	298	2·57	Woolwich	42,309	49	1·17
Chelsea	99,052	246	2·56	City of London	34,832	41	1·14
Clerkenwell	65,312	154	2·35	Strand	23,179	27	1·14
Hackney	211,493	551	2·29	St. Martin's	13,783	16	1·14
Shoreditch	123,186	283	2·29	St. Giles	38,114	43	1·11
Whitechapel	75,498	167	2·22	LONDON	**4,349,166**	**10,619**	**2·44**

TABLE XVII.

Diphtheria Incidence in London in the Year 1895.

(Sanitary Areas arranged in order of Incidence.)

	Estimated Population.	Notifications.	Rate per 1000.		Estimated Population.	Notifications.	Rate per 1000.
Greenwich	175,183	864	4·93	Shoreditch	122,932	233	1·89
St. George's-in-the-East	45,227	215	4·75	Paddington	122,756	229	1·86
Mile End Old Town	108,443	470	4·33	Hammersmith	108,429	199	1·83
Poplar	171,230	732	4·27	St. James, Westminster	23,149	42	1·81
Whitechapel	75,820	275	3·62	Strand	22,586	39	1·72
Camberwell	252,737	889	3·52	Islington	335,929	577	1·71
Bethnal Green	130,061	436	3·34	Marylebone	137,392	231	1·68
Rotherhithe	40,713	135	3·31	St. Olave, Southwark	13,065	22	1·68
Limehouse	56,885	185	3·25	St. George, Southwark	60,168	101	1·67
Fulham	117,745	378	3·21	Holborn	32,188	53	1·64
Chelsea	99,930	305	3·06	Stoke Newington*	35,234	57	1·61
St. Saviour, Southwark	26,570	65	2·44	Woolwich	42,768	67	1·56
St. Pancras	233,543	537	2·25	Lewisham	82,410	125	1·51
Hackney*	215,623	486	2·25	St. Giles	37,654	57	1·51
Lambeth	284,883	631	2·21	Hampstead	77,592	114	1·46
St. Luke's, Middlesex	40,763	90	2·20	Wandsworth	185,956	265	1·42
Battersea	165,130	363	2·19	St. Martin-in-the-Fields	13,536	18	1·32
Newington	119,358	262	2·19	Bermondsey	83,861	109	1·29
Kensington	167,671	367	2·18	City of London	33,824	43	1·27
Plumstead†	61,494	134	2·18	St. George's, Hanover Square	74,037	91	1·22
Clerkenwell	65,036	128	1·96	Lee†	38,832	46	1·18
Westminster	54,003	103	1·90	LONDON	4,392,346	10,772	2·45

* Stoke Newington is first shown separately from Hackney in 1895.
† Lee is first shown separately from Plumstead in 1895.

From these Tables it will be seen that certain districts are specially subject to Diphtheria; for example Poplar, Bethnal Green, and St. George-in-the-East are in each year found amongst the seven areas with the highest rates.

In the following Table (extracted from Table II. of Mr. Shirley Murphy's Memorandum), the Diphtheria death rates in England and Wales, and in London, in various periods up to 1890, are given for each of the first five years of age, and for groups of ages afterwards.

TABLE XVIII.

Diphtheria death rates per 1,000,000 *living at various age-periods.*

	Period.	All ages.	0–1	1–2	2–3	3–4	4–5	5–6	10–15	15–20	20 and upwards.
England and Wales	1855-60	178	542	743	706	776	723	414	172	68	22
	1861-70	184	581	909	803	832	736	393	136	59	26
	1871-80	121	287	489	483	580	547	291	88	33	17
	1881-90	163	282	685	773	896	848	424	100	36	17
London	1855-60	126	563	778	652	624	511	232	76	31	18
	1861 70	176	755	1,197	1,060	912	715	296	64	35	26
	1871-80	122	318	573	628	695	660	289	55	24	17
	1881-90	260	534	1,533	1,598	1,750	1,553	601	96	32	20

In Table V (a) of the same Memorandum the rates are given grouped thus—under 3 years, 3 to 10, 10 years and upwards; and in Table V (b) the percentage increases or decreases of the rates in these groups of ages from one decennium to another are shown. The following figures are extracted from Mr. Shirley Murphy's Table V (b).

TABLE XIX.

Decrease (—) *or Increase* (+) *per cent. in Diphtheria death rates.*

	All ages.	Under 3.	3—10.	10 and upwards.
In England and Wales				
Between 1861—70 and 1871—80	—34	—45	—27	—35
,, 1871—80 and 1881—90	+35	+38	+49	+3
In London				
Between 1861—70 and 1871—80	—31	—50	—11	—28
,, 1871—80 and 1881—90	+113	+140	+125	+35

Mr. Shirley Murphy's inferences from these figures are—that "the Diphtheria mortality at ages 3–10 years did not fall in 1871–80 in anything like the same degree as the Diphtheria mortality at all ages"—that "this new departure is most notable in London"—that "it is suggestive of a fresh factor of Diphtheria at ages 3–10 years becoming operative in the decennium 1871-80"—and that "as regards England and Wales and London in 1881–90, as compared with 1861–70, the special incidence on the age 3–10 years is practically maintained."

Now it may at once be freely admitted that if it were true to say—

(*a*) That children aged 3 to 10 years attend school, and that children under 3 years of age do not.

(*b*) Further, that Diphtheria has of late years increased greatly amongst children aged 3 to 10 years, whilst children under 3 years of age have been comparatively exempt,

then, undoubtedly there would be a very strong presumption that school attendance is the chief cause of the increased incidence of the disease. But are these statements correct? In order to test this, it is not enough to begin by grouping the facts under the ages 0–3 and 3–10; it is necessary to ascertain what is the age-grouping under which each set of facts most naturally falls. For instance, if it were found that the age of school attendance practically begins at 4 years, and that the special liability to Diphtheria begins at 2 years, there could be hardly a doubt that the two things are independent. In such a case, the age-grouping 0–3 and 3–10 would only suggest false conclusions.

The *average* numbers of children at various ages on the rolls of the London School Board in the four years 1892–95 were as follow:—

Under 3 years	403
3 years and under 4 ..	13,072
4 ,, ,, ,, 5 ..	30,069
5 ,, ,, ,, 6 ..	46,624
6 ,, ,, ,, 7 ..	53,460
7 ,, ,, ,, 8 ..	55,823
8 ,, ,, ,, 9 ..	53,512
9 ,, ,, ,, 10 ..	54,388
10 years and upwards ..	172,935
All ages ..	480,286

The average number of children in London living at age 3–4 may be taken as about 102,000; so, obviously, a very small proportion of children at this age are subject to the risk of school infection, and it is more correct to speak of 4 years instead of 3 years as the age at which school attendance commences. We should therefore expect that any tendency to school infection would show itself in a marked manner at age 4. Table XX., which has been calculated from the death rates at separate ages in Mr. Shirley Murphy's Table 2, shows how each separate age under 5 years was affected by the decrease of Diphtheria mortality in 1871–80 and its increase in 1881–90.

TABLE XX.

Decrease (—) *or Increase* (+) *per cent. in Diphtheria death rates.*

	Under 1 year.	1–2	2–3	3–4	4–5	5–10
In England and Wales						
Between 1861–70 and 1871–80	—51	—46	—40	—30	—26	—26
,, 1871–80 and 1881–90	—2	+40	+60	+54	+55	+46
In London						
Between 1861–70 and 1871–80	—58	—52	—41	—24	—8	—2
,, 1871–80 and 1881–90	+68	+168	+154	+152	+135	+108

The decline during 1871–80 was certainly least at school ages, and notably so in London; and so far the figures support Mr. Shirley Murphy's conclusions. But this cannot be said of the figures relating to the recrudescence of the disease in 1881–90. In England and Wales, as a whole, children aged 2–3 were most affected by this rise, while in London the increased incidence fell yet

a year earlier, the increase was much less at age 4 (the age at which school life practically begins) than in any of the previous three years of age, and was still less after age 5, at which compulsory attendance begins. Apparently, then, a fresh factor of Diphtheria became operative in 1881–90, which affected children *under school age* considerably more than those who were exposed to all the risks of school infection.

Enough has been said to show that the grouping of children as under and as over 3 years of age does not square with the facts either of school attendance or of Diphtheria incidence. In all that touches age incidence in what follows, I shall therefore deal separately with each year of life up to 5, and whenever possible up to 10 years of age.

There is an interesting fact in connection with the age incidence to which perhaps I might here allude—it is that the two sexes are differently affected by Diphtheria. In the first year of life boys are much more liable than girls to die of the disease; but this extra liability diminishes year by year, and in the fourth or fifth year is transferred to the female side. This is true both in London and in the other parts of the country, as will be seen from the following figures which are compiled from the Registrar General's last five Annual Reports:—

TABLE XXI.

Deaths from Diphtheria under 10 *years of age, in the five years* 1891-94.

		Age.						
		Under 1 year.	1–2	2–3	3–4	4–5	Total 0–5	5–10
London ..	Males	326	903	864	869	713	3,675	1,135
	Females	287	807	854	898	779	3,625	1,538
England and Wales excluding London	Males ..	643	1,343	1,494	1,773	1,600	6,853	3,424
	Females	510	1,223	1,430	1,762	1,655	6,580	4,141

It will be noticed that in London the maximum male mortality is at age 1, the female mortality steadily increasing for the next two years; whilst in the remainder of the country both sexes reach their maximum at age 3. But London and the remainder of the country are alike in this, that more females than males die from Diphtheria at age 4, and many more in the age group 5–10. It might be thought that these differences are accounted for by the facts (1) that more males than females are born, and (2) that the general mortality among males is greater year by year than that among females. Thus the excess of *male* mortality in the earlier years might be accounted for by the larger number born, and the excess of *female* mortality in the later years by the larger number of survivors. Reference to the Census Report shows that this explanation is inadequate. After making due allowance for the different numbers of the two sexes living at each age, the following figures show the percentage which the female mortality from Diphtheria bears to the male mortality *in equal numbers living at each age*:—

TABLE XXII.

Percentage of female mortality to male mortality.

	Age.					
	0–1	1–2	2–3	3–4	4–5	5–10
London	86·4	88·5	98·3	100·9	108·8	134·1
Remainder of England and Wales .	78·2	89·3	95·0	98·5	102·7	120·4

In London, the female mortality from Diphtheria under one year of age is 86·4 per cent. of the mortality among an equal number of males at the same age; the percentage increases year by year, until at ages 2 and 3 the mortality of the two sexes is practically equal; after this the female mortality is in excess, being 34 per cent. more than the male mortality in the age-period 5–10. In the remainder of England and Wales the female mortality is only 78·2 per cent. of the male mortality under one year of age; but, as in London, the percentage increases year by year, and the excess at age 5–10 is strongly marked, although it is not so great as in the case of London.

Now the age period 5–10 may be taken as very fairly representing school age; and any explanation of the incidence of Diphtheria in London must deal with the fact that, at this age, girls are *one-third* more liable to die of Diphtheria than are boys. It is hardly suggested by any one that school aggregation increases the amount of Diphtheria by so much as one-third; but here there is direct evidence of some influence or condition which either affects girls only, raising their Diphtheria mortality by one-third, or else affects girls more than boys, raising the mortality of both, but raising that of girls enormously more than that of boys. No difference of the school conditions of the two sexes can be imagined which would yield even a plausible explanation. The cause must be sought among conditions affecting boys and girls in different ways or to a different extent, *outside* the schools.

It is perhaps somewhat beyond the scope of this inquiry to search into the causes of the disease which are beyond the control of the school authorities. The object is rather to ascertain whether any serious amount of infection is the result of school influences, and to make such recommendations as may reduce the risk of school infection to a minimum. Still, it can hardly be out of place to suggest here two probably potent sources of infection which undoubtedly affect females more than males. Boys, after 2 or 3 years of age, live out of doors much more than girls do, and, therefore, are exposed for a shorter time to the risks of breathing the vitiated air of badly ventilated rooms. The habit of kissing is much more frequent among girls than among boys, and increasingly so with each year after infancy. Thus girls are more likely than boys to a condition of the throat, &c., which is favourable to the bacillus of Diphtheria; and they are much more often exposed to the risk of inhaling the breath of other children who may be suffering from the disease.

This conclusion is strengthened by the figures relating to some others of the zymotic diseases, as appears in Table XXIII. For all the four diseases there shown the mortality of females relatively to that of males tends to increase from infancy to the age period 5–10. But the increase in the case of those diseases—viz., Diphtheria and Whooping Cough—which are specially conveyed by the breath, is enormously greater than in the case of Measles and Scarlet Fever.

TABLE XXIII.

London 1890–94. *Percentage of female to male mortality from certain zymotic diseases at ages under* 10, *after allowing for different numbers of the two sexes living.*

	0-1	1-2	2-3	3-4	4-5	5-10
Measles	81·5	89·7	102·7	102·1	107·2	108·4
Scarlet Fever	89·1	92·4	100·0	89·5	103·5	103·2
Diphtheria	86·4	88·5	98·3	100·9	108·8	134·1
Whooping Cough	103·8	123·0	136·6	138·6	143·2	167·5

SECTION B.

London Notifications in respect of Age and Holiday Periods in Board Schools.

To test the *incidence* of Diphtheria on children of various ages in London (apart from the *mortality*, which is compounded of the incidence and the case-mortality, the latter of which may possibly vary largely at different ages), the actual notifications were ascertained for as many years as possible (*see* Tables XXXIII.–XXVIII., appendix), in separate years of age up to ten years and for the ages ten to fifteen in a group. Unfortunately, the ages were so imperfectly returned in the years prior to 1892, as to make the figures useless for any purpose of comparison. In 1892, 1893, and 1894, however, the ages were stated in 95 per cent., 97 per cent., and 98½ per cent. of the cases respectively. By assuming that the small residuum of unstated ages in each year should be divided out in the same proportions as the stated ages, a very close approximation to the truth is obtained.

The next process was to estimate the number of children of each age living in London in each year. The number of children at each age between 5 and 10 was calculated by interpolation by the method of finite differences, and the corresponding numbers living in each year since 1891 were estimated on the assumptions (1) that the increase of population has been at the same rate

since 1891 as between the censuses of 1881 and 1891, and (2) that the proportion of children of each age in the total population has remained the same as at the census of 1891.

The population and notifications, thus ascertained, were then placed side by side, and the number of notified attacks of Diphtheria per 1,000 living at each age was calculated.* The following table shows these attack rates for London in each year 1892–95, and also the average of the four years.

TABLE XXIV.

Diphtheria notifications per 1,000 *living at ages under* 15 *in London*, 1892–95 :—

Year.	Under 1 year.	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9–10	10–15
1892	1·61	4·16	4·91	6·45	6·90	6·61	5·64	4·64	3·33	2·83	2·14
1893	2·13	6·90	8·80	10·59	11·22	10·52	8·98	6·70	5·48	4·60	3·62
1894	1·92	6·30	7·94	10·67	10·00	9·91	8·45	6·58	4·71	4·22	2·94
1895	2·26	6·89	7·87	10·66	10·53	9·65	8·29	6·65	5·11	4·06	2·97
Average of 1892–95	1·96	6·07	7·39	9·61	9·67	9·18	7·85	6·00	4·66	3·93	2·92

The first noticeable point about these figures is that the greatest attack rate is either at age 4–5 or at age 3–4; the next that the attack rates are nearly equal for the three years of age 3–4, 4–5, and 5–6, and that on each side of this period of three years, the rates fall considerably. A closer examination shows that infants under one year of age are remarkably exempt, their rates being on the average only about three-fifths of the rates for children between 10 and 15 years of age, and barely one-fifth of the rates at age 4–5. This exemption, however, appears to cease on completion of the first year of life. If the notification returns may be trusted, the liability to Diphtheria is three times as great among children between 1 and 2 years of age, and four times as great among children between 2 and 3 years of age, as it is among infants in their first year. A possible explanation of this remarkable difference is that Diphtheria is often spread by children sleeping together, and that young infants, by sleeping with their parents escape this source of infection.

The same argument which has been used above in respect of the increase or decrease of Diphtheria mortality at particular ages in successive periods of time, is applicable to these notification rates, viz.:—if it can be said (1) that children above a certain age attend school, while those below that age do not, and (2) that children above that age are specially subject to Diphtheria, while those below it are comparatively exempt—then there will be a strong presumption that school attendance is the main factor in the spread of the disease. This point is so important that it is desirable to present it in the clearest possible manner. Two diagrams have, therefore, been prepared, the first of which (Diagram I., Plate XV.) shows the average number of children on the roll at each age under 10 years in the four years 1892-95, while the second (Diagram II., Plate XV.) shows the average number of Diphtheria notifications at each age under 10, in the same period. As the number to be represented in Diagram I. exceeds 50,000 at the maximum age, while the notifications do not reach 1,000, a uniform vertical scale for the two diagrams would have been inconvenient. Accordingly, the vertical scale of Diagram II has been made ten times as great as that of Diagram I.

A glance at the diagrams shows at once that the conditions just suggested do not exist. It is true that the notifications reach their maximum at age 3–4, the first year in which any appreciable number of children attend school; but they reach this maximum, be it noted, by a steady yearly rise through the ante-school period of life. In the two following years of life—ages 4–5 and 5–6—the school attending children are respectively more than double and more than treble as numerous as at the age 3–4—that is to say, greatly increased numbers of children are subjected to the risks of school infection—and yet at these very ages an actual *decline* in the numbers of attacks is shown.

Turning to the numbers themselves (which are printed at the tops of the columns in the diagrams), we find that the attacks at age 1–2 were nearly three times as many as in the first year

of life. At age 2–3 they were 26·8 per cent. more than at age 1–2; and at age 3-4 they were 27·4 per cent. more than at age 2-3. Thus the *proportional increase* was practically the same—27 per cent.—in the first year of nominal school life as in the year immediately preceding it. In the next year of age—4–5 years—an increase of 130 per cent. in the children attending school is accompanied by a decrease of 3·1 per cent. in the Diphtheria attacks; and at the age 5-6 a further increase of 53 per cent. in the children attending school is accompanied by a further decrease of 6·5 per cent. in the Diphtheria attacks.

Stronger evidence could hardly be adduced that age-susceptibility is the main factor in the selection of the victims of Diphtheria, and that, at the most, school aggregation acts only as a slightly disturbing element. It appears reasonable to suppose that if there were no school attendance at all the increase of attacks at age 3–4 over age 2–3 might be somewhat less than 27 per cent., and that the decrease in subsequent years might be somewhat more rapid than it actually is. But this is only another way of saying that Diphtheria is sometimes communicated at school; the age-incidence would probably be altered to a much greater extent if children were prevented from playing together out of school. Such suggestions are, however, entirely hypothetical. But it is a fact that a child becomes *more* liable to be attacked by Diphtheria year by year as it approaches school age, and becomes *less* liable year by year after it has reached school age.

In Diagrams I. and II. the actual numbers of children on the roll of the London School Board are compared age by age with the numbers of Diphtheria notifications. In Diagram III. these facts are combined with the total estimated numbers of children living at the several ages. This diagram shows the number of children at each age among whom one case of Diphtheria occurs, and also what proportions of the children are on the roll of the School Board. Under one year of age it takes 511 children, none of whom attend school, to produce one case of Diphtheria. At age 1–2, still with no children attending school, the liability is enormously increased; a case occurs among every 165 children. At age 2–3, with a very minute proportion of children attending school, a case of Diphtheria occurs in 135 children. At age 3–4 a case occurs in every 104 children, of whom 13 do, and 91 do not, attend school. After this age the proportions attending school rapidly increase, and it might therefore be expected that for the next few years the number of children per case of Diphtheria would successively *decrease*. The facts entirely fail to support this expectation. At age 4–5 a case of Diphtheria occurs among 103 children, which is practically the same number as at age 3-4; but of these 103, as many as 32 do, and 71 do not attend school. That is to say, a greater proportion of children are subject to the risk of school infection at age 4–5 than at age 3–4, and yet the proportion who take Diphtheria does not increase. At age 5–6 there is a further increase in the proportion of school attending children, and a further decrease in the liability to Diphtheria; it takes 109 children, 52 of whom do, and 57 do not attend school, to produce one case of the disease. At each subsequent age it takes a greater number of children to produce one case of Diphtheria, although increasing proportions are subject to whatever risks are incurred by attending school.

From the facts represented in these three diagrams, it is impossible to resist the conclusion that no *special increase of liability* to Diphtheria can be traced to the beginning of school attendance. In fact, the ages which are now the most subject to the disease would still be the most subject if aggregation in schools were abolished altogether. It may, or may not, be that the decrease of liability would commence at age 4–5, and would go on more rapidly in succeeding years than it really does; but the steady increase of liability at ages 1–2, 2–3, and 3-4 would remain practically unaltered.

In order to trace any local variations from the general results shown by the figures for the whole of London, the populations of the separate sanitary areas were similarly calculated, and in all cases in which the Diphtheria notifications were sufficiently numerous to give useful indications, their proportions to the populations were worked out. In some of these areas the notifications were given for separate ages in one or both of the years 1890 and 1891, as well as in the three years 1892–4. The following table shows the mean rates of attack, per 1,000 living, in 4, 5, or 6 years, as the case may be, for each of 17 districts.

TABLE XXV.

District.	Years.	Under 1 year of age.	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9–10	10–15
Battersea	1892—5	1·33	4·57	6·66	8·01	8·41	8·93	7·31	5·55	5·00	3·92	3·18
Bethnal Green . ..	1892—5	3·01	9·52	11·57	14·87	15·04	12·07	9·41	6·62	5·55	5·01	4·42
Camberwell	1892—5	1·72	5·85	6·45	8·91	8·22	8·81	7·39	5·46	4·72	3·65	2·64
Chelsea	1890—5	1·59	3·92	6·43	10·77	9·48	9·42	7 07	7·43	5·54	4·64	2·86
Fulham	1892—5	1·23	4·84	5·66	8·62	8·71	7·48	7·58	7·62	4·21	4·17	2·42
Greenwich	1892—5	2·25	7·58	9·09	9·83	11·73	10·83	7·89	6·56	5·09	4·83	3·66
Hackney	1890—5	1·19	4·04	6·20	8·46	9·09	9·80	7·75	5·75	4·07	3·92	2·97
Hammersmith	1892—5	1·87	3·60	4·41	8·86	11·60	10·01	7·74	6·93	5·68	3·84	2·40
Islington	1890—5	1·35	3·57	5·83	8·41	7·60	8·44	7·26	5·64	4·25	3·27	2·83
Kensington	1890—5	1·57	4·68	5·67	7·29	8·37	7·50	6·63	5·05	4·39	3·57	2·15
St. Marylebone .. .	1890—5	1·57	5·61	5·76	6·99	7·21	8 93	5·30	4·50	2·92	2 90	2·21
Mile End Old Town ..	1892—5	2·97	7·33	9·55	11·15	14·50	11·07	9·00	7·19	5·86	5·34	3·73
Paddington ..	1890—5	1·80	5·71	6·24	9·87	10·81	9·67	8·10	6·40	5·32	4·29	2·66
Poplar	1892—5	2·71	7·28	10·00	11·61	12·71	11·64	10·97	7·78	6·33	5·00	5·10
St. George's-in-the-East..	1891—5	3·24	13·31	14·40	14·67	15·62	13·79	9·25	6·59	6·43	7·06	4·00
St. Pancras	1892—5	1·87	6·51	7·58	9·85	10·92	11·39	10·44	6·03	5·47	3·80	2·73
Whitechapel	1890—5	3·18	10·79	11·02	14·00	10·89	8·10	7·89	4·02	4·47	1·98	2·23

An examination of this table shows that, as in the case of London taken as a whole, so also in the case of every one of these seventeen districts, the liability to be attacked by Diphtheria is comparatively low under 1 year of age, but increases enormously in the second year of life. In the several districts it then increases by smaller steps at the ages 2—3 and 3—4; reaches its maximum either in this latter year or in one of the following two years 4—5 and 5—6; and then (with a few insignificant exceptions) declines steadily year by year. In only three cases—Camberwell, Chelsea, and Whitechapel—is the actual maximum shown at age 3—4, but there is seldom any noticeable increase after this age. The period of greatest liability begins, then, *before* the real school-age has been reached. In general, the rates in the group of ages 3—6 are markedly higher than those at the ages on either side of this group. There are, however, several exceptions to this rule; thus in Bethnal Green, Greenwich and Poplar, the period of special liability begins at 2 years of age, and in St. George's-in-the-East and Whitechapel, yet a year earlier. In Whitechapel it stops short at 5 years of age; while in Hackney, Islington, Kensington, Paddington, Poplar, and St. Pancras it extends to 7, and in Fulham to 8 years of age. It will be seen at once that those districts—in which the special liability to attack commences at age 1, or at age 2—contain some of the poorest and most crowded sections of the population of London. This fact strongly indicates *the conditions of home life* as a much more potent factor in the spread of the disease than aggregation in schools.

The following table is of importance as showing the case mortality of Diphtheria in London at different ages. The great fatality of the disease at the earlier ages will be noted.

TABLE XXVI.

Shows the mortality from Diphtheria in London per 100 *cases for each year of age.*

	Under 1 year of age.	1	2	3	4	Total under 5 years of age.	5	10	15	20	25 and upwards	All ages.
1892.												
Diphtheria Notifications	170	411	507	650	672	2410	2096	909	685	551	1141	7,792
„ Deaths ..	129	325	315	322	297	1388	447	59	16	14	38	1,962
Rate per cent. ..	75·9	79·1	62·1	49·5	44·2	57·6	21·3	6·5	2·3	2·5	3·3	25·2
1893.												
Diphtheria Notifications	238	687	914	1077	1099	4015	3409	1550	1117	934	1999	13,024
„ Deaths ..	183	534	501	552	444	2214	806	98	35	22	90	3,265
Rate per cent. ..	76·9	77·7	54·8	51·3	40·4	55·2	23·6	6·3	3·1	2·4	4·5	25·1
1894.												
Diphtheria Notifications	213	624	820	1080	974	3711	3169	1253	628	529	1164	10,619
„ Deaths ..	160	432	439	464	364	1859	674	92	21	17	51	2,714
Rate per cent. ..	75·1	69·2	53·5	42·9	37·3	50·1	21·2	7·3	3·3	3·2	4·3	25·5

It was hoped that similar statistics might have been obtained from the large towns of the provinces, and that the relative severity of type of the disease might have thus been shown. It was found, however, that the numbers in provincial towns were too small to be reliable, and the idea was therefore abandoned.

Somewhat marked attention has been drawn to the fact that certain holiday periods in the Schools of the Board have occurred simultaneously with a decrease in the notifications of Diphtheria, and it is consequently by many assumed to have been proved that so-called school influence is the main factor in determining the spread of the disease.

I should not be prepared, without other evidence, to attach the importance which some are disposed to do to this point even if proved, but I think I shall be able to show there is nothing like constancy in the relationship of school holidays and a decrease in the notifications of Diphtheria

The accompanying Charts, Nos. 1, 2, 3, 4, 5 and 6, show graphically the weekly notifications of Diphtheria for the years 1890–95, with the holiday periods at the schools of the School Board for London marked by asterisks.

So far as Chart 1 is concerned, there is absolutely no evidence of any relationship in 1890 it will be noted that from the 28th week to the 31st week there is a gradual rise in the number of notifications, the 31st week being the first week of the holidays, then there is a fall, but the amount of Diphtheria for the next two weeks is above the mean for the year; and so it remains for the rest of the year with a striking exception, viz., the 52nd week, then there is a marked fall, which cannot be taken, however, in support of the school influence theory, for the depression occurs a little too early, and in the following week where we should have looked for a further decline we find instead an actual rise.

Chart 2 shows for 1891 much the same state of things, during the 12th and 13th weeks there is a fall in the curve; the latter being a holiday period, we naturally look, therefore, for a further fall in the 14th week, but we actually get a rise, and in the following or 15th week an increase above the mean for the year, and then from the 16th week for a period of three months, although the schools are in Session and Diphtheria is never absent, the incidence of the disease is for the most part well below the mean until the 33rd week, or the last week of the summer holidays, when there is a sudden rise above the mean, followed in the first week of school work by a sudden fall, subsequent to which the usual seasonal incidence occurs, followed by a somewhat peculiar fall in the 51st week of the same character as that noticed in 1890.

The Chart for 1892 gives no kind of support to the suggestion that in London a connection exists between the holiday periods and the incidence of Diphtheria; indeed, it will be seen that for the whole period of the summer holidays the amount of Diphtheria was above the mean, whilst for the 29th week, or that immediately before the holidays, and for the 34th week, or that immediately after the holidays, it was below the mean.

And in 1893 there is evidently again no kind of connection, for during the first week of the summer holidays the notifications were more numerous than they had been previously in the year, and in the second holiday week there was a marked decline, followed, however, in the third week by a great increase, no school influence possibly being at work.

The curve for 1894 shows for the summer holidays during the first two weeks, a place for the curve above the mean, the previous three weeks of school life being below the mean, and for the latter two weeks of the holidays and the first two weeks of school work, the notifications are shown below the mean.

Chart No. 6 for 1895 at first sight appears to show that school influence does play a part in the spread of Diphtheria. It will be noted that there is a marked drop in the number of notifications at the very commencement of the holidays, and that the notifications as suddenly rise on their termination. But, as will be presently seen from the results of the special enquiry instituted, there is no markedly greater proportion of cases whose

infection is traceable to schools in the three months July to September than in the previous three months April to June. This at once raises the question whether the drop during the holidays is really due to the closure of the schools or to some other cause. With a view of solving this question, a very careful analysis of the notifications has been made. The school holidays lasted from the 27th of July to the 24th of August. Taking the notifications at each age, then, for the four weeks preceding the holidays, *i.e.*, the four weeks ending August 3rd—for school influence would naturally be manifested some days after the closure of the school—and comparing them with the notifications during the four weeks of holiday, *i.e.*, the four weeks ending August 31st, and also with those of the four weeks after the holiday, *i.e.*, the four weeks ending September 28th we get the following table:—

TABLE XXVII.

Notifications in London at each age for the four weeks before, during and after the holidays in August, 1895.

4 weeks ending—	0	1	2	3	4	5	6	7	8	9	10	11	12	13–15	15 and upwards
August 3	33	66	82	116	119	103	81	65	54	48	34	29	30	48	228
August 31	18	59	59	74	71	57	62	39	30	32	31	19	13	35	201
September 28	25	56	73	114	109	86	92	71	46	39	44	23	24	40	233

It is at once apparent that the drop in the notifications is almost as marked at the ages below school-age as at school-ages, and is also well marked at ages above school-age. The recrudescence after the holidays is also seen in the three groups of ages, though here the increase is most marked in children of school-age.

The following table gives the notifications of Diphtheria for each of the Sanitary Districts of London for the quarter ending September, 1895, and on reference to it we are at once struck with the fact that these districts differ considerably in their behaviour. Thus, in most of the Western districts the drop during the holidays is well shown, whereas the recrudesence is not so marked, being, indeed, absent in the case of Chelsea. In the case of Fulham, also, we see that there was a sharp outbreak during the last week of the holidays—an outbreak, moreover, which was not maintained on the re-opening of the schools.

TABLE XXVIII.

Return of Notifications of cases of Diphtheria made to the Metropolitan Asylums Board during each week in July, August, and September, 1895.

Local Authorities in whose Districts the cases were resident.	13 July.	20 July.	27 July.	3 Aug.	10 Aug.	17 Aug.	24 Aug.	31 Aug.	7 Sept.	14 Sept.	21 Sept.	28 Sept.
WEST—												
Kensington	14	12	16	10	12	4	4	8	8	8	8	13
Fulham	9	18	7	7	2	..	14	6	4	9	4	10
Hammersmith	6	4	10	4	7	1	1	..	..	4	5	4
Paddington	7	3	8	5	4	6	1	4	5	5	6	10
Chelsea	15	10	8	6	3	1	5	7	3	6	3	4
St. George's, Hanover Square	3	2	3	3	1	..	..	..	..	3	3	4
Westminster	..	2	2	2	..	4	..	..	2	..	2	2
St. Peter's, Westminster	..	..	..	..	..	..	..	..	..	..		..
St. James, Westminster	1	1	2	..	2	..	2	1	3	..		..
NORTH—												
Marylebone	7	7	7	3	5	3	3	7	7	6	6	9
Hampstead	1	4	1	3	5	..	..	4	1	3	..	3
Pancras	15	8	12	11	8	6	5	8	9	14	27	27
Islington	6	12	13	13	10	8	6	8	12	19	13	11
Stoke Newington	3	..	..	..		2	1	..	2	2	1	..
Hackney	6	4	9	10	9	3	3	3	12	10	19	17

Local Authorities in whose Districts the cases were resident.	13 July.	20 July.	27 July.	3 Aug.	10 Aug.	17 Aug.	24 Aug.	31 Aug.	7 Sept.	14 Sept.	21 Sept.	28 Sept.
CENTRAL—												
St. Giles	2	..	..	.	..	1	2	..	..	1	4	1
St. Martin-in-the-Fields	2	1	..	1	..	..	..	..	1	..	..	..
Strand	..	..	..	..	..	1	1	..	2	1	..	1
Lincoln's Inn												
Inner Temple												
Middle Temple												
Gray's Inn	Nil.											
Charterhouse												
Staple Inn												
Furnival's Inn												
Holborn	1	..	2	6	..	..	..	4	1	2	3	2
Clerkenwell	2	4	6	1	1	..	4	1	3	3	2	4
St. Luke's, Middlesex	4	..	4	..	3	1	2	2	1	2	4	1
London, City of	..	1	1	3	2	1	1	1	1	1	..	..
EAST—												
Shoreditch	5	4	6	4	5	3	7	6	7	6	3	7
Bethnal Green	19	15	11	6	4	5	15	11	18	10	15	13
Whitechapel	9	6	13	9	8	8	7	3	7	3	4	5
St. George-in-the-East	6	12	9	4	11	9	6	5	4	8	11	7
Limehouse	8	8	4	3	3	4	2	6	6	7	4	2
Mile End Old Town	13	15	16	12	16	8	13	6	14	15	16	9
Poplar	14	16	16	21	14	23	19	10	12	19	17	16
SOUTH—												
St. Saviour, Southwark	1	2	2	1	..	1	2	1	1	5	2	3
St. George, Southwark	1	..	2	1	2	4	1	3	5	3	2	6
Newington	4	11	8	8	6	5	11	3	3	5	5	5
St. Olave, Southwark	..	2	..	2	..	.	..	1	..	..	1	2
Bermondsey	1	1	5	5	1	1	..	5	3	1	2	2
Rotherhithe	1	6	11	3	1	3	4	1	.	1	3	8
Lambeth	24	16	26	15	21	15	9	11	16	17	13	17
Battersea	8	1	5	7	4	7	4	2	5	3	5	9
Wandsworth	7	11	7	6	7	3	5	4	1	4	1	5
Camberwell	17	19	18	25	15	14	19	28	15	21	21	23
Greenwich	28	27	17	21	18	17	11	9	17	22	25	24
Lewisham (including Penge)	3	2	..	2	1	1	2	3	1	2	2	3
Woolwich	4	..	3	2	2	1	1	1	..	..	..	1
Plumstead	1	..	2	2	..	..	2	..	3	1	2	2
Lee	..	..	..	..	..	..	..	1	1	..	1	.
Port of London	..	..	..	..	..	..	..	.		..	.	..
GRAND TOTALS	278	267	292	247	213	174	195	184	216	252	265	292

The Northern districts differ somewhat, for while the variation in Marylebone is but slight, and Hampstead shows a steady decrease from a maximum in July, St. Pancras, Islington and Hackney show a marked drop and a most marked recrudescence in the second, third, and fourth weeks after the re-opening of the schools.

The Central districts were comparatively free from the disease during all three periods.

It is in the Eastern districts that the figures are most remarkable. It will be at once seen that in Shoreditch the notifications steadily increased to a maximum in September, whilst in St. George's-in-the-East and in Poplar the figures remain practically stationary throughout the three periods. In Whitechapel there is a decrease from a maximum in July, whilst in Bethnal Green, Mile-End and Limehouse there is a slight drop during the holidays, followed by an equally slight recrudescence in September. Further, in Bethnal Green the recrudescence occurs in the fourth week of the holidays, and in Mile-End in the second and fourth weeks, while in St. George's-in-the-East there is a marked outbreak in the second week.

The Southern districts present somewhat similar figures. Thus, Newington, Wandsworth and Woolwich decrease throughout all three periods. Camberwell, Battersea and Lewisham remain practically constant, whilst St. George's Southwark increases to a maximum in September. In Lambeth, Rotherhithe and Bermondsey the drop during August is somewhat marked, but the recrudescence in September is only slight. In Greenwich alone there is a marked drop in August, followed by an equally marked rise in September.

It is thus seen that the various sanitary areas show a marked divergence in the incidence of the disease before, during, and after the school holidays. School influence should be the same in all of them, but we find that in the crowded Eastern and Southern districts (with the exception of Greenwich) the school holidays practically did not affect the prevalence of Diphtheria.

Only in the West and Northern districts is the marked fall followed by the equally marked rise noticeable.

From these considerations it would appear, therefore, that the full explanation of the curve for 1895 also must be sought for elsewhere than in school influences.

Is it not probable that the decreased number of notifications during the school holidays is in a great measure due to the fact that many children are then taken into the country, leaving fewer susceptible people in London? This explanation would account for the persistence of the notifications in the poorer districts concurrently with their decrease in other parts of London.

With a view, if possible, to throw further light on the alleged influence of Elementary Schools on the spread of Diphtheria, the weekly notifications of this disease and also the school holidays have been obtained from some of the principal towns in England for the years 1891, 1892, 1893, 1894 and 1895; for obviously, if school influence plays the part in London attributed to it, and of which proof is sought by a reference to the holiday periods, the same kind of evidence should be forthcoming from our large towns.

These returns—for which I am greatly indebted to the various Medical Officers of Health—have been carefully analysed and a table has been prepared which shows the notifications for the weeks in the middle of which the summer holiday occurs.

TABLE XXIX.

Giving Diphtheria Notifications with the holiday periods for certain weeks in the years 1891-95, *in various large towns.*

DIPHTHERIA NOTIFICATIONS—SUMMER HOLIDAYS.

Week ..	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Manchester—																			
1891	7	8	9	6	2	4	19	**6**	**6**	**10**	**9**	7	7	9	6	9	9	7	11
1892	7	8	8	7	9	9	9	**8**	**3**	**4**	8	9	12	8	11	6	6	13	8
1893	12	14	13	20	13	19	26	**14**	**10**	**14**	**7**	9	8	12	8	5	10	12	24
1894	7	15	15	9	5	7	10	**8**	**15**	**12**	7	6	10	4	10	3	5	15	17
1895	2	5	11	8	8	5	3	**5**	**5**	**6**	5	5	3	2	3	9	8	13	7
Salford—																			
1891	5	0	2	4	1	3	3	**3**	**4**	**6**	**7**	3	2	4	3	6	4	4	3
1892	6	6	4	2	3	2	0	**0**	**6**	**2**	0	7	13	6	5	4	5	4	3
1893	5	1	4	6	2	5	2	**4**	**0**	**6**	**0**	3	5	9	2	2	5	2	1
1894	3	3	2	2	6	2	7	**4**	**5**	**2**	**0**	0	5	3	3	4	5	6	4
1895	6	2	4	2	2	2	4	**4**	**2**	**3**	**2**	3	0	0	2	7	2	5	4
Oldham—																			
1891	1	1	2	0	0	1	1	0	1	2	0	0	**0**	**0**	**0**	**2**	0	1	0
1892	0	2	0	0	1	2	0	1	0	1	1	**0**	**2**	**2**	**0**	0	0	1	0
1893	0	1	0	0	0	0	0	1	2	0	1	**1**	**0**	**2**	**1**	0	0	0	1
1894	1	2	1	2	3	0	1	1	1	1	0	**1**	**0**	**2**	**4**	1	4	1	0
1895	2	2	1	1	0	1	1	3	1	0	2	3	**0**	**0**	**1**	**1**	0	0	0
Liverpool—																			
1891	4	2	1	2	1	3	**4**	**0**	**6**	**2**	5	4	6	10	2	7	3	1	4
1892	3	2	6	0	3	3	**5**	**3**	**1**	**2**	6	1	4	3	5	9	3	6	2
1893	3	4	3	6	4	5	**5**	**1**	**4**	**2**	**4**	1	1	7	2	6	4	6	5
1894	5	9	4	6	1	2	**6**	**4**	**3**	**2**	**5**	4	4	6	2	3	16	9	6
1895	1	8	5	10	4	3	**3**	**2**	**7**	**1**	**4**	3	2	6	2	3	5	4	5
Sheffield—																			
1891	5	1	1	1	6	3	7	6	3	**3**	**1**	**2**	0	0	5	1	7	1	1
1892	3	5	8	4	4	1	1	1	4	**5**	**2**	**4**	2	2	3	5	2	4	5
1893	2	0	3	2	5	0	2	4	1	**1**	**2**	**1**	2	3	0	2	2	4	6
1894	0	0	1	5	3	0	1	2	1	**1**	**2**	**1**	2	3	2	0	3	3	2
1895	0	1	0	0	0	2	0	1	1	**3**	**3**	**5**	1	2	1	1	0	3	0
Newcastle-on-Tyne—																			
1891	1	0	1	2	**1**	**3**	**0**	**0**	1	2	1	3	1	0	5	0	1	0	2
1892	1	4	2	**2**	**0**	**1**	**3**	**1**	3	1	10	4	5	2	3	6	1	5	3
1893	1	2	2	**2**	**3**	**2**	**6**	**4**	2	1	1	2	3	3	2	3	4	3	9
1894	5	1	3	3	**1**	**2**	**0**	**1**	**2**	1	0	2	0	1	2	2	3	3	4
1895	1	1	2	2	**2**	**4**	**4**	**2**	**4**	2	5	4	2	0	3	4	6	8	2
Birmingham—																			
1891	3	1	3	4	3	2	2	4	3	**1**	**4**	**2**	**3**	1	2	6	2	5	2
1892	9	9	3	9	15	26	16	13	10	**10**	**14**	**13**	**11**	9	12	9	15	10	8
1893	4	6	9	5	7	9	4	13	11	**11**	**5**	**7**	7	5	9	8	11	8	9
1894	4	5	5	3	6	4	7	11	4	**5**	**1**	**6**	2	4	12	6	9	2	4
1895	8	8	9	12	14	13	10	18	**8**	**16**	**6**	**9**	7	14	14	14	15	15	18

NOTE.—The holiday periods are approximately represented by the figures in thick black type.

These figures, taken as a whole, show scarcely any perceptible fluctuations of the incidence of the disease which could fairly be attributed to school influence. In a few cases, however, some entirely different influence seems to have been at work, *i.e.*, the incidence of the disease seems to have increased during the holidays, pointing perhaps to increased facilities for its spread in the crowded courts and streets. Thus in 1891, in Manchester, a decided increase is observed in the last week of the holidays. Again in 1893, in the same town, the disease whilst being present in comparatively large amount during the holidays, shows a marked drop after their end. The holiday period of 1894 shows somewhat similar figures.

The figures presented by Liverpool, Newcastle-on-Tyne, Sheffield and Oldham are wholly negative in their bearing on this question.

In Salford again, in 1891, a steady increase in the incidence of the disease is noticeable through the holiday periods with a drop after their close. In 1892 and 1893 there is an outbreak of the disease in the middle of the holiday period. In 1894, however, the disease seems to slacken towards the end of the holidays and to recrudesce on the opening of the schools.

Of course, in all the foregoing instances the figures are small, and it is therefore unfair to draw too many conclusions from them, but the negative character of their evidence is itself a strong argument against any preponderating influence exercised by the Elementary Schools on the spread of the disease. Surely in such towns as the above, where Elementary Schools are in as full operation as in London, we should reasonably expect to find the same increase in the incidence of Diphtheria. This, however, is not the case, and therefore other causes must be looked to for the increase in the Metropolis.

In Birmingham the figures given are wholly against the idea of the closure of schools exercising any influence on the incidence of the disease. Thus, in 1892, it is very noticeable that the disease was more prevalent during the holiday periods, and that it dropped somewhat after the schools had re-opened. Again in 1895, the second week of the holidays is marked by a considerable rise in the incidence of Diphtheria. In reference to this, Dr. Alfred Hill, the Medical Officer of Health, writes to me as follows:—

"I have endeavoured to trace the influence of school attendance during the year 1895, with the following results:—I have obtained information from 517 invaded houses; in 163 of them no school was attended. The first patient attacked attended school in 186 instances, but the 186 patients were distributed over no less than 74 schools. Further, in only 41 out of these 186 cases could I learn that there had been a previous case at the school within a fortnight. In 168 instances the patient did not attend school, but some children from the house did so. In only 30 of these, however, had there been a previous case within a fortnight at the school. These figures seem to show that in Birmingham the schools have exercised but little influence in the spread of Diphtheria. It should be borne in mind that special steps are taken to prevent children from infected houses continuing to go to school, notices being given both to the parents and to the school officers that their attendance must cease until they are certified fit to resume."

The negative influence of schools is also confirmed in Glasgow by the experience of my friend Dr. Russell.

In this connection I may, perhaps, add my own experience as Medical Officer of your Board, a position I have had the honour of filling for six years, during the whole of that time I have never known a school, or any department of a school, under the control of the Board, to be closed because of an epidemic of Diphtheria, nor have I known any true epidemic to be connected with a school, by which I mean a large number of cases—relatively to those in attendance—arising amongst the children in the course of seven or fourteen days; a condition of things, in my judgment, mainly consequent upon compliance with the rules of the Board, which call for the exclusion of all children from infected houses.

Owing to the kindness of my esteemed friend Professor Pistor, I am able to include in this report the weekly death returns from Diphtheria in Berlin for the five years, 1891-1895.

TABLE XXX.

Weekly deaths from Diphtheria in Berlin, from the 24th to the 35th weeks, 1891–1895.

	Weeks ..	24	25	26	27	28	29	30	31	32	33	34	35
Berlin—	1891	12	22	11	**8**	**14**	**10**	**10**	8	15	15	15	20
	1892	17	21	14	16	**19**	**25**	**15**	**16**	15	25	18	17
	1893	28	20	27	30	22	**30**	**23**	**19**	**16**	15	24	26
	1894	21	23	14	7	**7**	**16**	**32**	**11**	11	32	25	22
	1895	22	16	13	10	**19**	**15**	**23**	**13**	7	14	12	16

In this table the weekly deaths for the months June to September are given, the holiday periods being shown by the figures in thick black type. From these figures it will be at once seen that there is no diminution in the deaths during the holidays, a remarkable increase at times being evident, notably in 1894 and 1895.

A diagram (Diagram IV., Plate XIX.) has also been made showing the deaths at each age up to 10 years for the period 1891 to 1895, and for comparison, similar diagrams (Diagrams V. and VI., Plate XIX.) have been prepared for London and also for England and Wales without London for the last five years available—1890-1894.

It would have been interesting to have compared the figures in the above diagrams for the years of life above five. Unfortunately, however, the deaths are not shown in the Registrar General's reports for separate years of age over five; but the diagram showing the notifications in London at each age up to ten, leaves room for no reasonable doubt that, as in Berlin, so also in London, the mortality from Diphtheria decreases year by year from five to ten years of age. The close similarity between the diagrams for Berlin and London is at once apparent. Whereas, however, in London the compulsory school-age commences at 5 years, that in Berlin does not commence until 6. Had, therefore, the mere fact of attendance at elementary schools any great influence on the age incidences of Diphtheria, one would naturally have expected to find a considerable divergence in the above diagrams.

I cannot emphasise too greatly the importance of these facts, and the bearing which they have on the question upon which I am engaged.

PART III.

Special Enquiry.

With the view, if possible, of obtaining definite information as to the origin of the disease in a large number of consecutive cases, the following communication was addressed to the Metropolitan Medical Officers of Health, in the hope that from them sufficient information might be obtained to enable a complete enquiry to be made into every case of Diphtheria notified in London.

SCHOOL BOARD FOR LONDON.

VICTORIA EMBANKMENT,

Re DIPHTHERIA IN LONDON.

30th January, 1896.

MY DEAR SIR,

I beg to forward for your information the following copy of a Resolution passed by the School Board for London, at their meeting on the 24th inst.:—

"That the Medical Officer be requested to report generally on the prevalence of Diphtheria in London and elsewhere, and its alleged connection with the Elementary Schools; and further to advise what, if any, steps the Board should take in the matter."

I shall be much obliged for any information you can give me which may be of service in reference to this enquiry, or for any direct evidence bearing on the suggestion that the Elementary Schools have contributed to the recent prevalence of Diphtheria in London.

I am,

Yours very faithfully,

Medical Officer of the Board.

To_____

Medical Officer of Health for_____

For various reasons, however, this attempt proved abortive, and the desired information had to be obtained by other means. Towards the end of March, 1895, through the kindness of the Metropolitan Asylums Board, to whom I would at once acknowledge my great indebtedness, it became possible to make arrangements by which enquiries were made into the origin of the disease in each case of Diphtheria admitted into the Hospitals of that Board. The procedure adopted was as follows:—Printed forms (Form I.) as follows:—

SCHOOL BOARD FOR LONDON.

FORM I. DIPHTHERIA ENQUIRY.

1. Name of Patient	Sex_____ Age last birthday_____
2. Full Address	
3. Date of first symptoms of illness	
4. Did Patient go to school?	
5. Name and *address* of school..	
6. Date of Patient's last attendance at school	
7. Previous illness in house, with dates	
8. Number of children in family, with ages	
9. Friends' account of origin of disease	
10. Remarks	

_____ Medical Superintendent.

_____ Hospital.

Date_____

were distributed to the various Ambulance Stations of the above mentioned Board.

On a case of Diphtheria being removed to Hospital, the nurse who removed the case by direction of the Ambulance Committee filled up one of these forms and forwarded it to the Offices of the School Board. On the receipt of which, those cases which were of school age were separated from the others, and a second form (Form II.) was at once sent out to the Head Teacher of the School where the child attended, for the subjoined information, with directions that it should be at once returned to the School Board Offices.

SCHOOL BOARD FOR LONDON.

FORM II. DIPHTHERIA ENQUIRY.

1. Name and Age of child	
2. Date of last attendance of the child at school	
3. Number of children in the same classroom as the child ..	
4. Had any of these children any throat affection during the fortnight *before* the affected child's illness?	
5. If so, state as far as possible (*a*) The number	
(*b*) The date when the symptoms were noticed	
6. Have any of the children in the classroom had any throat affection *since* the affected child's illness?	
(*a*) The number	
(*b*) The date when the symptoms were noticed	
7. What children attending the school have been notified to you as cases of Diphtheria for a fortnight before this case or since? Give the names, ages, date of notification, and date of last attendance at school in each case	

_____ Head Teacher.

_____ School.

Date _____

In addition, every means was adopted to obtain information from the parents of the children affected by the disease, and especially was this the case in the months of July to September during the school holidays, personal visits being then necessary.

By these means, accurate information was obtained with regard to 2,168 consecutive cases—a number quite unprecedented in any previous enquiry and sufficiently large to exclude many sources of error. It is also worthy of note that the cases arose during both school and holiday periods, and are, therefore, typically representative.

The next point requiring to be determined was the length of the incubation period of the disease. Careful enquiries were made of various authorities on this point and I finally decided to adopt the conclusions arrived at by the Committee appointed by the Clinical Society of London in 1888 to investigate the incubation periods of the various specific fevers. The conclusions arrived at by them are as follow:—"The incubation period of Diphtheria does not as a rule exceed four days, and is more often two days than any other period. Not infrequently it extends to five, six, or seven days, but it is doubtful whether it ever exceeds the last-named period."

Acting, therefore, on this statement, seven days has been taken as the limit of the incubation period beyond which a given case could not fairly be attributed to infection from a previous case at school. It must also be remembered that the Hospitals of the Metropolitan Asylums Board do not at present provide accommodation for the whole of the cases of Diphtheria notified in London; and the question, therefore, at once arises as to how far the cases removed to

Hospital are a fair sample of the total cases notified? To answer this, Table XXXI. has been prepared, in which the notifications for each age are given in two periods of three months—viz., from April to June and from July to September—and also for the whole six months together. With these figures, the removals to Hospital at each age for the same periods are compared, and the percentages of removals to notification are calculated.

TABLE XXXI.

Showing percentage of cases removed to Hospital to total notifications at different ages for two periods of three months—April to June and July to September, and for the whole six months—April 1st to September 30th.

Age.	April to June.			July to September.			April to September.		
	Total Notifications.	Total Removals to Hospital.	Percentage of Removals to Notifications.	Total Notifications.	Total Removals to Hospital.	Percentage of Removals to Notifications.	Total Notifications.	Total Removals to Hospital.	Percentage of Removals to Notifications.
Under 1	53	23	43·39	85	19	22·35	138	42	30·43
1—2	176	78	44·31	200	58	29·00	376	136	36·17
2—3	195	85	43·58	237	86	36·28	432	171	39·58
Total below School Ages	424	186	43·86	522	163	31·22	946	349	36·89
3—4	266	143	53·75	334	118	35·32	600	261	43·50
4—5	240	118	49·16	325	130	40·00	565	248	43·89
5—6	205	103	50·24	273	97	35·53	478	200	41·83
6—7	163	72	44·17	265	106	40·00	428	178	41·59
7—8	119	69	57·98	194	84	43·29	313	153	48·88
8—9	85	39	45·88	148	51	34·45	233	90	38·63
9—10	68	37	54·41	128	60	46·87	196	97	49·48
10—11	52	37	71·15	114	42	36 84	166	79	47·59
11—12	63	26	41·26	78	34	43·59	141	60	42·56
12—13	47	25	53·19	76	40	52·63	123	65	52·85
Total at School Ages	1,308	669	51·14	1,935	762	39·37	3,243	1,431	44·12
13—25	289	125	43·25	541	143	26·43	830	268	32·28
25—35	126	43	34·12	191	35	18·32	317	78	24·61
35—45	48	15	31·25	101	11	10·89	149	26	17·45
45—55	28	8	28·57	25	5	20·00	53	13	24·53
55 and upwards	11	1	9·09	11	1	9·09	22	2	9·09
Total above School Ages	502	192	38·24	869	195	23·6	1,371	387	28·23
Grand Total	2,234	1,047	46·86	3,326	1,120	33·67	5,560	2,167	38·97

On examining this table, it will be seen that during the first three months the percentage of total removals to total notifications was 46·86, or practically about one-half. On looking, however, into the various age groups, we find that the removals are still greater for the school ages 3–13, being as many as 51·14 per cent. of the notifications. If the second three months be now examined, the proportion of removals is found to be smaller. Whilst nearly 100 more cases were removed to Hospital during this latter period, the percentage of total removals to total notifications had sunk to 33·67, consequent upon the much greater epidemic prevalence of the disease in this period. Again, the percentage of removals at school ages to the notifications at the same ages presents a more favourable aspect, reaching the satisfactory figure of 39·37 per cent.

Finally, taking the two periods together, we find that at all ages the percentage of removals to notifications was 38·97, whilst at school-ages—the most important group from the point of view of this report—the percentage rises to 44·12.

From a consideration of these facts it may, I think, be contended that the 2,000 odd cases examined may fairly be held as representative of the whole number notified during the period taken.

The Cases were then classified into three groups—

Group I. Cases below school age or under 3 years.

„ II. Cases of school age or from 3 to 13 years.

„ III. Cases above school age or from 13 years and upwards.

Group I. was further divided into four sub-groups, viz., 1—Cases in which the source of infection could not be traced; 2—Cases in which the infection could be traced to a *school-attending*, but not *school-infected* child; 3—Cases in which the infection could be traced to a possibly *school-infected* child; 4—Cases in which infection could be traced to other sources than school.

Group II. has been divided into three sub-divisions, viz., sub-division A including all those cases who attended school within seven days of the occurrence of the first symptoms of their disease; sub-division B including those cases which did not attend school within seven days of their first symptoms; each of these sub-divisions is further sub-divided according to the sources of their infection; and sub-division C which includes those cases about which full information could not be obtained.

Group III. is divided into four sub-groups in the same manner as Group I.

TABLE XXXII.

Classification of cases of Diphtheria admitted into the Hospitals of the Metropolitan Asylums Board from April 1st to September 30th, 1895:—

I.—Cases below school age, or under 3 years.		
1. Cases in which the source of infection could not be traced	267	
2. Cases in which the infection could be traced to a *school-attending**, but not *school-infected* child	22	
3. Cases in which the infection could be traced to a possibly *school-infected* child	6	
4. Cases in which infection could be traced to other sources than school..	55	
		350
II.—Cases of school age, or from 3 to 13 years.		
A. Cases which attended school within seven days of the occurrence of the first symptoms of disease:—		
1. Cases in which no source of infection could be found	594	
2. Cases in which possible infection could be traced directly to the school	92	
3. Cases in which infection could be traced indirectly to school ..	14	
4. Cases in which infection could be traced to other sources than school	139	
		839
B. Cases which did not attend school within seven days of the occurrence of the first symptoms:—		
1. Cases in which infection could not be traced	432	
2. Cases in which the infection could be traced to a *school-attending,** but not *school-infected* child	28	
3. Cases in which the infection could be traced to a possibly *school-infected* child	4	
4. Cases in which infection could be traced to other sources than school	81	
		545
C. Cases about which full information as to school attendance could not be obtained		47
		1,431

III.—Cases above school age, or 13 years and upwards.

1. Cases in which infection could not be traced	325	
2. Cases in which the infection could be traced to a *school-attending,** but not *school-infected* child	5	
3. Cases in which the infection could be traced to a possibly *school-infected* child	8	
4. Cases in which infection could be traced to other sources than school	49	
	——	387
	Total	2,168

* The term "School attending child" is intended to apply to a child who attended School within seven days of the first symptoms of its illness from the disease, although careful enquiries failed to prove any connection between the School attendance and the source of infection

From this table it will be seen that 58·6 per cent. of the cases of Diphtheria at school ages occurred amongst children attending elementary schools. Now it has already been shown in Table XI. that 60 per cent. of the children living at school ages attend elementary schools, and from this it would therefore appear that the disease is equally incident on children attending schools and upon those not attending.

Looking at the figures from another point of view, however, it will be seen that the cases of school age attributable to school infection—110 out of 1,431—form 7·6 per cent. of the cases, whilst 220 cases out of the 1,431, or 15·4 per cent., can be traced to other sources. These figures would seem at least to show that school influence is but a small factor in the spread of the disease.

Summarising the whole of the figures, with the exception of the 47 cases about which full information could not be obtained, it will be found—

First, that no source of infection was discoverable in 1,618 cases.

Second, that infection was traceable directly or indirectly to school in 124 cases.

Third, that infection was traceable to a school-attending child and casting, therefore, some suspicion on the school, in 55 cases.

Fourth, that infection was traceable to other sources than school in 324 cases.

Here again, in only 124 cases can the disease be fairly attributed to school influence, or only in 5·7 per cent. of the whole. On the other hand, 324 cases are traceable to other sources, to which number should probably be added the 55 cases traceable to school-attending children, as the most careful enquiry failed in each of these cases to throw any suspicion upon the school itself; nearly 15 per cent. of the cases are traceable to other sources, and if we include the above 55 cases, the percentage becomes nearly 18.

CONCLUSIONS.

The conclusions at which I arrive from a consideration of the foregoing, are :—

1. That Diphtheria has always been more prevalent in the south-eastern counties of England than elsewhere, and from them it spread to London, whilst it still maintained its prevalence in them, such counties as Staffordshire, Durham, and Lancashire (the congenial home of most zymotics) being comparatively free.

2. The recrudescence of the disease in 1881-90 was greatest in England and Wales at the age 2 to 3 years, and in London at the age 1 to 2 years, in both cases *before school age.*

3. The Diagrams I. and II. show that the notifications of Diphtheria in London increase *rapidly* after age 1 year is reached, and go on increasing until the beginning of school age, when a decrease sets in. This shows that *age* as an absolute factor in the incidence of the disease is enormously more active than any school influence.

The notification rates are *nearly constant* through the age period 3 to 6 years, but practically school attendance does not begin until *near the middle* of this period, *i.e.*, some time after age 4 is reached.

4. If separate districts of London be examined, the same state of things is noticed, viz., the period of greatest liability to the disease *begins* before school age is reached, and, therefore a principle of *ante hoc ergo propter hoc* is required if the age incidence of the disease is to be explained by school attendance. In some of the poorest metropolitan districts the special liability to Diphtheria commences at a still earlier age than in other parts of London, suggesting overcrowding as a probable potent cause.

5. The variations of Diphtheria during and after school holidays undoubtedly suggest that some amount of infection takes place at school (which no one disputes), but taking the year 1895 in which a remarkable fall occurred in the holidays, the fall was found to affect children of non-school ages almost to the same extent as children of school age, and the fall was not shared in (or only very slightly) by the poorest districts. It is probable then that such variations are in great measure explained by the smaller number of children in London during the holidays.

6. The remarkable similarity of the age incidence of mortality in Berlin to that in London —although school age begins at quite a different time—strengthens the conclusion already expressed, that age, not school attendance, is the chief factor in the incidence of the disease.

7. The progressively greater liability of girls as compared with boys—in relation to age—points to personal contact as another important source of infection.

8. The comparative immunity of infants under one year of age, suggests that older children often infect one another at night, young infants being removed from this risk by sleeping with their parents.

9. That as the result of a special inquiry into 2,168 consecutive cases, a very small number of cases could be traced to even a possibility of school infection.

10. That school influence, as such, plays but an unimportant part in the enormous increase of the disease during recent years in London.

RECOMMENDATIONS.

The recommendations which I suggest should be adopted with the object of reducing the possibility of school infection to a minimum are:—

1. In view of the fact that children suffering from sore throat are thereby more predisposed to Diphtheria, and further that a slight case of sore throat may be of a Diphtheritic nature, I would recommend that all children suffering from sore throat should be excluded from attendance at school, and an intimation of such exclusion given on a printed form to the Medical Officer of Health for the district.

2. With the view of determining without delay whether such sore throats are of a Diphtheritic nature, it is most desirable that there should be the means provided at the disposal of the local sanitary officials for this purpose; such means should embrace the opportunity for a bacteriological examination, and it would appear most convenient that such should be provided by the Metropolitan Asylums Board as the central authority dealing with the treatment of infectious disease in the Metropolis. This would have a two-fold advantage:—

(1) The School Board for London could thus obtain reliable information whether the case of sore throat was of a Diphtheritic nature; and

(2) If the case were of a Diphtheritic character, it would be amenable to proper treatment—by prompt removal to hospital—at the earliest possible moment; a point which has been shown by the statistics just published by the Superintendents of the Fever Hospitals of the Metropolitan Asylums Board, to be of the greatest possible value in the application of the anti-toxic serum treatment.

3. It would appear necessary that the attention of the Metropolitan Medical Officers of Health should be pointedly drawn to the duty imposed upon them by the Public Health (London) Act 1891, Section 55 (iv.), to send within twelve hours a copy of the notification certificate to the Head Teacher, as the experience of the Board is that undue delay has frequently taken place in this respect, with the consequences that children coming from infected houses have remained for days in attendance at school.

Note.—No enquiry was made into the 2168 cases referred to on page 31, with the view of ascertaining the cause of infection, beyond the point of determining whether school influence had in any way existed. In 324 cases, however, a source of infection other than school influence was obvious.—W.R.S.

C.S.& S.—300—B.4929—2.5.96.

4. The attention of the teachers should likewise be drawn to your Board's "Code of Regulations and Instructions for the guidance of Managers, Correspondents and Teachers," (Article 148) requiring them to exclude from attendance at school all children coming from infected houses, to endorse on the certificate the action taken, and to forward the same to the Medical Officer at the School Board Offices, so that a proper ledger account may be kept of the amount of infectious disease in connection with the schools of the Board.

5. The desirability of promoting legislation, for providing that the Medical Officer of Health shall furnish a certificate to the Head Teacher informing him when children thus excluded may be re-admitted to school.

I cannot conclude this report without acknowledging my indebtedness to the General Purposes Committee of your Board for the facilities they have given me for conducting this enquiry, as well as to Mr. A. C. Waters, of Somerset House, who has throughout rendered me most valuable help, to Dr. Harold Simmons who assisted me in the earlier part of the enquiry, and to Dr. F. D. Harris who very ably assisted me during the greater part of my enquiry, especially that in Part III.

WILLIAM R. SMITH,

M.D., D.Sc., F.R.S.Edin.,

Medical Officer of the Board.

20*th April*, 1896.

APPENDIX.

TABLES XXXIII. TO XXXVIII.

Shewing for each year since 1890, the Age and Sex Incidence of Diphtheria in every Sanitary Area in London.

NOTE.—These Tables form the basis for Tables XIII. to XVII.

TABLE XXXIII.—THE NOTIFICATIONS OF DIPHTHERIA IN EACH SANITARY AREA IN LONDON, FOR THE YEAR 1890, DISTRIBUTED ACCORDING TO AGE AND SEX.

	Under 1		1		2		3		4		5		6		7		8		9		10 to 15		15 to 20		20 to 25		25 to 30		30 and upwards		Unrecorded.	Total.
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Kensington	1	2	6	4	3	4	5	12	10	9	8	3	5	8	2	3	3	9	7	5	11	14	5	15	7	8	3	5	7	19	13	218
Fulham	..	1	2	1	4	1	..	3	2	2	1	5	1	..	4	2	..	2	..	..	3	2	..	1	..	..	..	1	1	5	27	68
Hammersmith	1	1	2	2	5	1	3	4	2	5	2	3	1	2	1	4	2	1	1	1	1	6	5	3	1	2	..	1	..	1	155	220
Paddington	2	1	3	4	3	4	10	4	10	9	4	5	5	7	7	6	6	3	6	4	12	18	10	9	2	12	4	12	9	16	12	219
Chelsea	4	3	2	4	9	8	10	13	6	9	10	18	5	4	7	12	4	5	4	3	12	22	6	12	8	25	2	15	5	20	13	280
St. George's, Hanover-sq.	.	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	1	..	1	..	1	3	..	..	..	..	..	1	..	1	63	73
Westminster	..	..	..	1	1	1	1	..	2	1	..	2	..	..	..	1	2	..	..	..	2	2	1	2	..	1	..	..	..	1	22	43
St. James, Westminster	..	..	..	..	..	..	..	..	..	..	..	..	..		..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	12	12
Marylebone	1	3	1	4	2	7	4	1	6	1	5	4	2	1	1	1	..	2	1	3	2	6	2	12	3	7	3	3	4	4	6	102
Hampstead	..	..	1	..	4	..	1	1	1	2	3	2	1	2	3	2	1	1	1	4	3	4	1	3	..	3	..	1	2	..	47	94
St. Pancras		..	3	4	14	5	5	4	3	1	3	4	3	4	1	1	3	1	1	2	7	7	3	1	..	1	1	2	..	2	318	404
Islington	1	1	6	4	8	10	16	14	13	10	7	9	14	14	8	5	3	8	4	9	26	43	14	26	8	13	11	14	9	25	38	391
Hackney	..	3	5	8	13	11	18	12	21	18	10	22	16	15	11	10	6	9	6	6	19	35	16	29	7	17	6	24	12	30	9	424
St. Giles'	..	..	3	..	..	..	..	..	..	..	..	..	..	1	..	..	2	..	..	..	..	2		..	..	1	..	..	..	..	36	45
St. Martin-in-the-Fields	..	1	..	..	..	..	..	..	..	1	1	1	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	1	..	2	6
Strand	..	..	..	..	..	1	..	..	..	1	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	1	1	7
Holborn	..	1	..	1	2	1	2	1	2	1	1	..	..	2	1	..	1	1	..	..	1	2	..	1	..	2	..	..	.	1	11	35
Clerkenwell	1	..	2	..	2	1	2	..	1	..	2	2	2	..	1	..	1	1	1	2	2	1	..	6	..	4	..	..	3	1	40	78
St. Luke	1	..	..	1	1	4	..	2	1	..	1	1	..	1	..	..	1	3	1	..	2	3	..	1	1	1	..	1	1	1	5	34
City of London	..	.	2	3	..	1	1	..	..	1	..	..	..	1	2	..	..	..	..	1	1	..	1	..	..	..	..	2	..	1	20	37
Shoreditch	..	2	2	3	3	2	1	1	2	3	2	6	1	..	.	2	..	..	..	..	3	4	3	3	1	2	1	2	..	..	148	197
Bethnal Green	2	1	6	12	19	9	8	14	16	18	9	13	11	10	9	7	1	4	1	8	10	25	8	19	6	8	6	8	6	11	103	388
Whitechapel	4	1	4	5	10	3	8	7	7	5	4	5	5	3	3	2	1	8	..	..	..	7	..	3	2	3	1	3	4	1	4	113
St. George-in-the-East	2	1	3	2	6	5	3	6	..	3	2	1	..	2	1	..	1	1	1	1	3	5	3	5	1	1	1	3	3	4	26	96
Limehouse	..	1	4	1	3	4	7	6	6	2	2	2	2	2	2	5	2	4	..	1	2	11	1	6	2	3	..	.	2	3	35	121
Mile End	1	1	1	1	2	2	2	1	4	2	4	5	..	1	4	4	1	1	2	..	1	3	..	3	1	3	2	2	..	1	81	136
Poplar	..	1	..	1	4	4	1	2	1	1	..	2	..	2	3	2	..	1	..	..	3	4	1	3	1	1	..	2	..	1	351	392
St. Saviour, Southwark	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	..	..	29	30
St. George, Southwark	..	..	1	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	21	25
Newington	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	2	..	..	..	1	..	..	..	..	3	8
St. Olave, Southwark	..	..	..	..	..	..	..	..	..	.	..	..	1	..	..	..	..	..	..	1	..	1		..	.	..	..	..	1	..	3	7
Bermondsey	..	..	1	..	..	..	1	..	1	1	..	1	..	..	..	..	..	..	1	.	..	..	..	..	..	..	..	1	1	..	60	68
Rotherhithe	1	1	1	1	3	1	1	1	2	1	3	.	1	..	1	..	..	..	1	..	2	3	2	..	1	5	..	..	..	2	44	78
Lambeth	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	.		.	..	..	..	4	..	2	..	1	1	..	..	.	307	317
Battersea	..	..	1	3	4	2	5	7	6	4	9	8	6	5	7	8	5	4	4	7	26	23	10	21	7	18	2	17	13	35	36	303
Wandsworth	..	..	..	1	1	1	..	1	..	2	2	2	1	..	2	2	..	2	1	1	5	1	2	..	..	..	..	..	..	2	80	109
Camberwell	..	..	..	1	..	..	1	..	..	1	..	1	2	..	..	..	..	..	1	..	..	1	..	..	1	..	..	1	1	..	243	254
Greenwich	..	..	..	1	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	169	172
Lewisham	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..		..	..	..	..	..	..	..	..	..	..	..	39	41
Woolwich	..	..	..	1	..	..	..	1	..	1	1	..	1	..	..	1	..	1	..	..	..	..	1	..	..	..	1	.	1	1	..	11
Plumstead	..	..	2	2	1	1	1	1	3	5	4	..	1	1	2	..	..	..	1	2	1	1	1	2	2	1	1	4	1	2	25	68
Port of London	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	2	5
	22	26	64	76	127	94	119	122	123	120	102	131	89	88	83	80	48	72	48	61	162	265	97	188	62	144	46	126	87	193	2659	5729

TABLE XXXIV.—THE NOTIFICATIONS OF DIPHTHERIA IN EACH SANITARY AREA IN LONDON, FOR THE YEAR, 1891, DISTRIBUTED ACCORDING TO AGE AND SEX.

	Under 1		1		2		3		4		5		6		7		8		9		10 to 15		15 to 20		20 to 25		25 to 30		30 and upwards		Unrecorded.	Total.
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Kensington	..	2	3	2	4	6	1	3	12	9	4	13	2	9	3	8	2	1	2	1	8	17	6	8	6	13	1	11	2	16	13	188
Fulham	..	1	1	2	1	1	3	3	..	1	2	2	4	1	..	1	1	..	..	..	1	4	3	2	..	2	2	..	..	2	32	72
Hammersmith	3	..	1	3	6	5	2	4	8	4	8	6	3	4	3	5	1	2	4	3	1	8	1	1	1	3	1	3	3	4	183	284
Paddington	4	1	7	5	5	7	8	6	8	1	10	6	7	5	5	7	3	3	..	4	10	12	6	7	3	8	8	9	6	9	5	185
Chelsea	1	..	2	..	5	3	4	5	6	5	4	4	3	2	6	4	6	5	2	2	12	12	8	15	9	8	2	6	7	15	22	185
St. George's, Hanover-sq.	..	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	1	..	2	2	..	..	..	..	..	..	..	..	75	83
Westminster	1	1	1	1	2	1	4	4	3	1	2	3	1	2	..	1	..	..	1	..	1	2	2	1	1	2	2	..	2	2	5	49
St. James, Westminster	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	20	20
Marylebone	2	2	4	6	3	3	3	4	3	10	4	8	1	4	4	3	..	4	3	3	4	3	6	5	6	9	2	8	8	15	9	149
Hampstead	..	..	..	1	1	1	..	3	2	3	2	2	3	1	5	1	..	4	1	..	3	3	1	4	2	4	..	7	..	3	45	102
St. Pancras	2	2	1	9	7	7	7	14	7	14	5	8	2	4	2	4	2	2	..	1	3	14	..	7	2	4	3	3	1	4	159	300
Islington	2	4	14	9	26	5	27	25	21	27	21	29	18	27	18	28	8	28	9	16	37	52	27	41	12	33	11	24	17	41	46	703
Hackney	2	4	9	5	16	12	16	13	18	20	23	15	17	11	7	13	8	4	8	9	15	24	19	15	6	11	7	12	17	28	13	397
St. Giles'	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	27	28
St. Martin-in-the-Fields	..	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	5
Strand	..	..	..	..	..	1	..	..	1	..	1	..	..	1	..	..	..	..	..	..	..	2	1	1	..	2	1	..	..	..	..	11
Holborn	1	..	..	1	3	..	..	1	..	..	..	..	..	..	..	..	..	..	1	1	1	2	1	..	2	1	..	..	..	..	16	31
Clerkenwell	..	1	1	3	..	1	1	2	..	4	2	3	3	2	1	..	3	1	1	..	4	5	3	2	1	3	1	5	3	2	63	121
St. Luke	1	..	3	3	2	3	1	..	3	3	1	1	1	1	1	..	1	..	..	1	1	3	..	3	2	3	..	3	2	3	11	58
City of London	..	..	..	1	2	..	..	..	2	2	1	..	..	..	..	1	1	..	1	..	1	..	..	..	..	1	..	1	..	..	20	35
Shoreditch	1	1	7	2	2	5	6	6	9	6	10	3	6	2	1	2	2	4	3	3	7	8	3	8	2	5	2	1	4	4	91	219
Bethnal Green	3	1	10	7	8	5	14	12	16	13	10	5	10	10	1	5	4	7	2	3	12	13	13	10	8	11	11	7	4	15	33	283
Whitechapel	3	2	9	3	4	20	9	11	3	8	5	7	5	6	2	1	3	5	..	9	5	9	..	7	3	4	3	1	4	4	5	157
St. George-in-the-East	..	2	3	5	1	4	4	4	5	4	3	5	2	2	1	3	..	2	2	..	1	9	3	3	3	2	1	5	2	..	9	90
Limehouse	1	1	4	3	3	2	2	2	2	3	..	..	..	..	1	2	..	2	..	..	4	9	..	2	1	1	2	1	..	1	21	70
Mile End	1	1	..	3	2	2	1	..	..	..	2	1	..	1	1	1	..	2	..	1	1	1	..	..	..	..	..	..	1	..	84	106
Poplar	..	1	..	1	5	4	6	2	1	4	2	1	4	..	1	1	2	1	..	1	5	8	3	1	1	1	..	1	2	4	390	453
St. Saviour, Southwark	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	38	38
St. George, Southwark	..	..	1	3	1	..	2	2	1	..	1	1	2	..	..	..	..	..	..	..	1	3	..	..	..	..	..	..	..	1	31	51
Newington	..	..	4	1	2	3	2	3	4	3	1	4	1	1	2	1	1	..	..	1	3	6	..	2	2	3	..	2	3	2	43	100
St. Olave, Southwark	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	..	4	7
Bermondsey	..	1	..	2	2	..	1	1	1	..	1	..	..	3	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	64	77
Rotherhithe	..	..	..	..	1	1	1	..	2	2	..	1	..	..	..	..	..	..	..	2	..	..	1	1	3	2	1	..	2	1	12	33
Lambeth	1	..	..	..	2	1	1	..	..	1	1	1	..	1	..	..	..	2	..	..	1	1	1	1	..	..	..	..	1	..	292	308
Battersea	1	..	3	1	7	6	4	11	11	12	13	17	8	8	5	4	5	9	7	10	10	20	7	20	8	4	11	10	18	17	46	313
Wandsworth	..	..	..	1	..	2	..	4	..	3	2	1	..	1	..	..	1	..	..	1	..	..	1	2	..	..	..	..	1	2	147	169
Camberwell	..	..	1	2	1	1	3	..	2	2	..	1	2	2	1	1	1	1	..	..	1	2	..	2	1	..	..	..	1	2	210	240
Greenwich	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	153	154
Lewisham	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	52	54
Woolwich	..	..	..	..	..	..	..	..	1	..	1	..	..	2	..	1	1	..	..	..	..	..	1	..	..	..	..	..	..	1	..	8
Plumstead	1	..	2	2	4	1	3	3	..	2	1	3	4	1	..	..	..	..	..	1	2	1	..	..	..	..	..	1	1	1	20	54
Port of London	..	..	..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	..	..	.	..	1	..	.	..	..	..	..	1
	31	28	92	88	123	114	137	149	155	167	144	152	111	115	71	98	56	89	49	70	157	255	117	173	87	141	73	121	113	200	2510	5991

TABLE XXXV.—THE NOTIFICATIONS OF DIPHTHERIA IN EACH SANITARY AREA IN LONDON FOR THE YEAR 1892, DISTRIBUTED ACCORDING TO AGE AND SEX.

	Under 1		1		2		3		4		5		6		7		8		9		10 to 15		15 to 20		20 to 25		25 to 30		30 and upwards		Unrecorded.	Total.
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Kensington	4	..	3	2	4	8	7	6	2	6	4	8	3	4	2	1	7	3	1	3	7	12	4	10	5	12	..	16	4	16	9	173
Fulham	..	2	1	3	1	4	5	4	3	7	2	7	6	2	4	3	..	7	..	1	6	4	2	2	2	5	2	2	1	3	1	92
Hammersmith	1	3	5	9	10	6	14	10	23	16	16	23	14	12	16	8	8	9	10	4	11	16	5	13	4	9	3	8	5	17	4	312
Paddington	2	..	2	7	3	8	7	5	9	3	8	8	7	4	2	3	2	1	3	3	3	11	3	11	5	16	6	6	4	14	4	170
Chelsea	..	1	1	5	2	4	7	8	7	10	6	7	2	4	4	6	4	1	1	4	8	5	8	10	5	7	3	10	7	13	7	167
St. George's, Hanover-sq	..	..	3	2	1	3	3	2	1	3	2	2	1	3	..	4	..	2	..	..	6	3	2	4	3	2	2	2	3	5	62	126
Westminster	3	..	9	3	4	6	7	13	11	9	5	3	3	7	3	6	1	3	1	5	8	8	5	3	..	1	..	3	3	4	2	139
St. James, Westminster	..	..	1	1	1	.	1	.	..	..	1	..	..	..	4	1	..	1	..	..	..	1	4	2	..	3	..	..	4	..	1	26
Marylebone	3	1	6	2	5	11	10	7	12	9	8	10	12	6	6	3	3	2	5	2	4	19	13	9	4	11	3	9	5	14	6	220
Hampstead	..	..	2	5	3	3	6	6	7	6	2	4	6	4	3	4	2	2	1	3	4	5	4	4	2	8	1	6	4	15	6	128
St. Pancras	7	7	8	7	13	12	14	14	14	25	12	22	13	21	5	11	9	12	7	11	18	25	11	18	8	12	6	18	10	17	23	410
Islington	9	7	15	10	32	20	24	27	26	19	32	42	19	33	20	22	12	7	7	21	29	61	21	38	20	35	11	17	22	36	14	708
Hackney	2	4	17	8	20	11	15	24	18	25	26	36	23	22	9	19	10	11	15	12	33	52	29	33	19	31	11	23	17	37	9	621
St. Giles'	.	3	1	2	2	..	3	1	1	1	3	2	..	2	..	2	1	3	2	1	3	..	..	3	1	1	..	1	..	2	17	58
St. Martin-in-the Fields	1	..	..	1	..	1	1	4	2	1	..	..	1	1	..	2	..	..	1	1	..	..	..	3	1	1	..	..	1	1	1	25
Strand	1	..	..	2	..	..	1	1	..	4	3	..	1	..	..	1	1	1	..	..	..	4	..	..	1	1	1	3	1	1	..	28
Holborn	..	..	1	1	2	2	3	3	..	3	3	3	2	2	1	1	1	..	..	1	2	6	1	..	3	2	..	..	2	2	16	63
Clerkenwell	..	..	5	1	3	5	5	12	4	7	6	6	2	6	5	1	1	3	1	1	5	4	5	8	2	4	2	5	1	3	3	116
St. Luke	1	2	2	..	..	2	1	3	3	3	1	1	1	1	2	2	..	..	..	..	3	3	1	..	.	4	..	1	1	2	1	41
City of London	2	1	3	1	4	5	2	6	5	2	3	2	1	3	1	2	..	1	..	..	4	4	2	3	3	6	1	11	..	7	7	92
Shoreditch	3	5	6	8	8	6	6	8	11	8	3	6	3	3	6	4	4	4	1	2	13	13	1	12	6	7	4	10	7	10	10	198
Bethnal Green	8	7	19	11	15	21	17	28	19	22	15	24	14	12	9	19	8	11	7	9	26	38	32	31	14	29	11	18	17	25	1	537
Whitechapel	6	2	11	10	11	5	14	22	15	10	7	13	11	9	4	2	7	1	2	5	7	12	9	6	7	6	2	6	6	10	3	241
St. George-in-the-East	..	4	10	3	6	2	5	10	11	5	5	5	2	3	3	..	1	1	1	6	4	7	7	2	2	5	3	5	3	6	1	128
Limehouse	..	1	2	3	2	4	2	3	7	3	3	5	1	2	..	1	2	1	1	1	2	6	5	8	1	2	1	3	4	3	1	80
Mile End	6	6	6	10	6	9	6	4	13	13	9	11	6	16	3	3	5	5	3	1	15	21	5	12	6	5	2	6	2	19	17	251
Poplar	5	3	5	4	11	15	15	14	8	14	15	6	12	8	12	8	7	9	2	5	33	34	23	36	12	26	4	17	19	42	11	435
St. Saviour, Southwark	..	..	..	1	..	..	1	2	3	4	1	1	1	..	3	1	..	..	..	..	..	3	3	4	4	1	..	2	1	4	..	40
St. George, Southwark	3	1	3	5	2	3	1	5	3	4	1	..	3	2	2	1	..	4	1	1	1	2	2	2	1	3	2	3	3	5	5	74
Newington	5	2	7	8	6	4	5	14	6	4	3	2	4	2	1	2	3	6	4	3	4	9	5	8	5	7	3	7	3	9	..	151
St. Olave, Southwark	1	..	1	..	4	..	..	..	1	1	..	2	..	..	..	..	..	..	..	..	..	1	..	1	..	..	1	2	1	..	..	16
Bermondsey	3	..	3	6	4	1	4	3	1	..	4	3	..	..	1	2	2	1	2	1	4	6	5	8	3	6	5	1	2	7	1	89
Rotherhithe	..	..	5	2	1	2	3	2	..	..	1	1	2	..	1	2	..	2	..	..	4	2	3	2	..	3	..	1	..	5	..	44
Lambeth	3	4	10	17	13	12	15	14	15	26	14	14	15	13	6	10	13	10	5	8	18	27	7	9	7	12	3	6	10	16	143	495
Battersea	3	2	8	3	11	13	9	8	12	10	7	9	10	10	10	9	7	8	7	3	22	24	15	21	16	17	6	25	15	30	..	350
Wandsworth	..	3	1	4	4	5	4	12	11	10	9	11	14	15	3	5	7	5	2	6	7	15	8	13	11	7	2	5	3	17	19	238
Camberwell	.	2	6	9	13	8	15	14	14	7	7	8	9	9	4	11	4	3	4	5	14	15	14	11	4	7	10	12	8	19	9	275
Greenwich	3	2	8	5	8	6	6	9	9	8	8	3	3	8	2	4	3	..	1	1	17	10	3	5	7	3	2	2	10	13	3	172
Lewisham	1	..	1	3	2	..	3	5	4	7	3	8	3	12	4	5	4	3	1	5	3	5	3	7	1	6	1	2	1	14	6	123
Woolwich	..		..	..	1	1	1	1	1	..	..	..	..	..	..		2	..	1	1	2	..	1	1	1	..	..	1	..	1	..	16
Plumstead	..	..	6	2	4	9	7	6	4	4	12	10	2	10	..	2	2	1	2	2	8	8	..	4	..	2	2	3	4	6	2	124
Port of London	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	86	75	203	186	242	237	275	340	316	319	270	328	232	271	161	193	113	144	102	138	358	501	271	377	196	325	116	278	214	470	425	7792

TABLE XXXVI.—THE NOTIFICATIONS OF DIPHTHERIA IN EACH SANITARY AREA IN LONDON, FOR THE YEAR 1893, DISTRIBUTED ACCORDING TO AGE AND SEX.

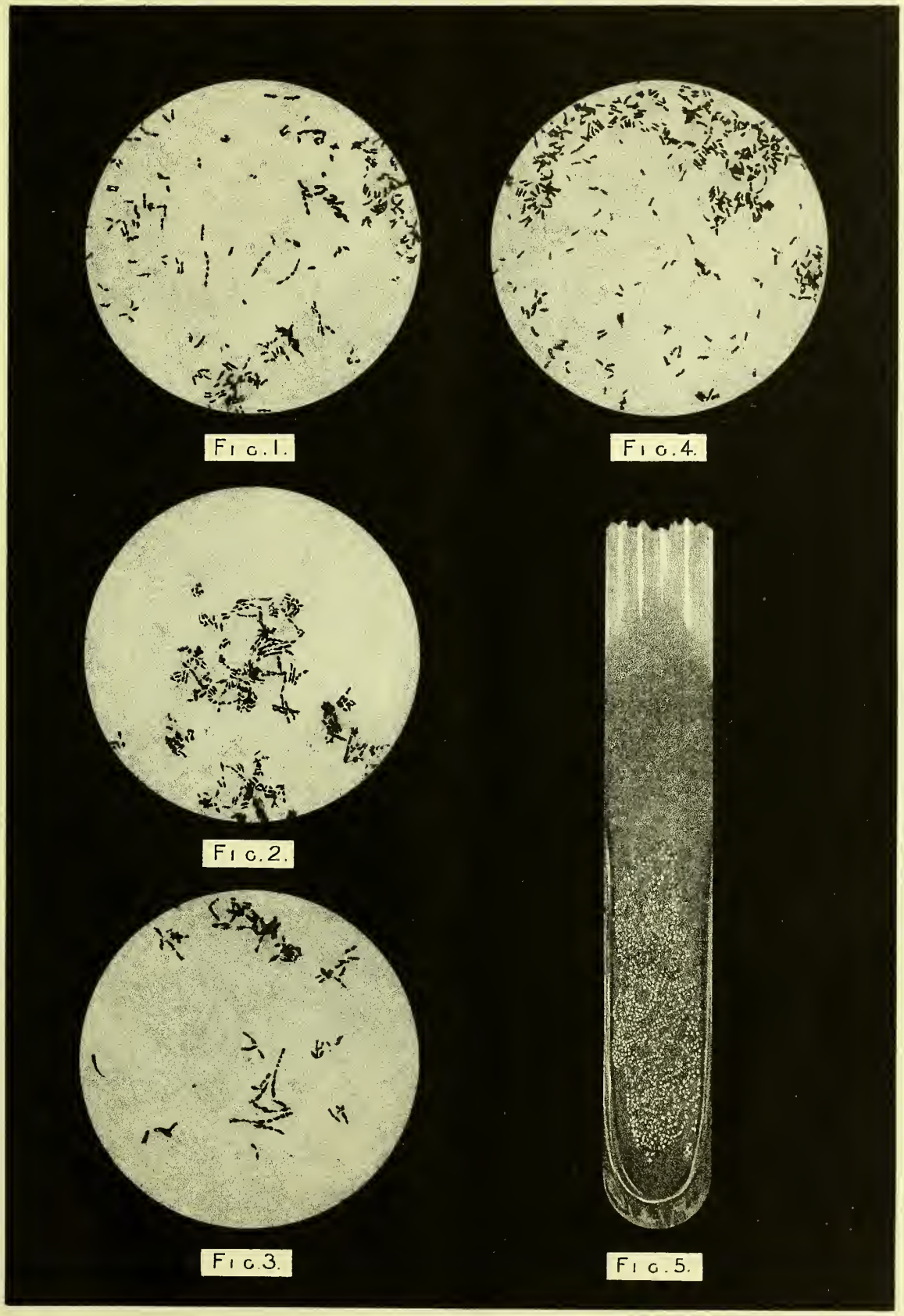
	Under 1		1		2		3		4		5		6		7		8		9		10 to 15		15 to 20		20 to 25		25 to 30		30 and upwards		Unrecorded.	TOTAL.
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Kensington	5	3	7	8	8	11	9	16	17	14	16	16	17	9	6	16	7	12	8	5	10	29	13	12	8	19	3	17	18	22	5	366
Fulham	1	3	9	3	10	11	4	6	11	11	9	9	4	7	7	5	9	3	3	5	13	21	2	3	4	13	4	9	12	18	1	230
Hammersmith	2	6	3	2	1	2	11	13	14	17	19	6	11	11	10	8	8	8	5	3	15	21	10	13	5	14	6	5	5	17	2	273
Paddington	3	5	4	9	8	7	10	15	14	10	10	13	5	8	4	5	5	6	1	4	8	13	11	16	10	15	9	8	13	20	10	279
Chelsea	2	2	7	4	5	8	12	7	11	3	6	10	8	5	8	6	2	4	1	5	9	18	8	16	7	8	3	7	8	20	3	223
St. George's Hanover-sq.	..	2	..	1	1	6	5	4	9	2	4	4	2	5	..	4	1	1	1	1	3	4	4	3	2	4	..	3	8	9	23	116
Westminster	2	2	3	1	2	6	3	3	3	5	2	3	3	1	1	2	2	2	1	3	4	7	1	3	1	6	2	1	1	5	1	82
St. James, Westminster	..	..	4	..	2	2	6	3	3	2	1	..	..	2	2	1	..	1	1	1	2	3	1	1	..	4	1	3	..	1	..	47
Marylebone	3	3	12	12	11	11	19	7	19	11	17	19	10	12	9	4	9	5	4	6	21	18	18	24	12	10	5	18	18	29	6	382
Hampstead	2	..	3	2	5	4	1	9	5	2	3	2	..	7	3	5	1	6	4	4	8	14	7	6	3	17	2	6	8	18	2	159
St. Pancras	6	4	32	30	36	18	29	35	27	52	35	29	24	37	20	17	15	16	12	7	45	43	21	28	16	26	13	19	16	33	22	763
Islington	4	6	17	18	26	28	34	41	21	37	44	37	29	39	19	29	22	13	5	15	50	57	32	47	24	33	17	22	35	66	11	878
Hackney	3	1	21	13	32	29	36	40	29	33	31	42	25	29	17	28	21	21	13	18	41	63	29	59	34	41	15	40	44	60	15	923
St. Giles'	1	..	3	4	6	4	4	2	2	2	..	3	2	1	..	..	1	1	1	1	..	6	2	4	..	6	2	2	3	4	6	73
St. Martin-in-the-Fields	..	..	2	2	3	..	1	..	..	2	1	1	..	..	..	1	1	..	..	..	..	1	1	1	..	1	..	1	2	1	..	22
Strand	..	1	4	2	4	1	7	2	5	2	3	2	1	1	2	2	3	4	1	..	2	6	1	3	..	6	2	4	2	2	2	77
Holborn	2	1	5	1	5	5	4	10	2	4	4	4	2	2	..	1	3	1	1	1	2	3	5	2	1	4	..	1	2	4	14	96
Clerkenwell	4	3	13	8	13	10	20	5	8	11	9	6	5	9	7	6	2	9	2	6	12	17	11	15	10	12	6	8	9	23	4	283
St. Luke	2	2	11	2	8	5	13	6	3	6	..	5	4	5	.	5	1	1	1	2	3	4	7	8	2	14	..	11	3	8	1	143
City of London	..	1	1	1	2	4	2	6	2	1	2	..	3	4	..	6	..	..	1	2	5	2	3	1	3	2	..	4	3	3	..	64
Shoreditch	3	3	15	17	15	25	22	17	18	17	11	21	14	20	15	17	7	10	3	11	23	26	18	30	12	16	11	13	13	33	4	480
Bethnal Green	6	9	28	16	30	27	25	33	31	40	23	26	16	19	10	9	8	13	5	12	33	51	30	39	19	27	21	31	26	36	3	702
Whitechapel	5	4	8	14	12	9	11	8	7	9	6	3	4	14	3	5	3	3	1	3	7	11	9	8	2	7	6	11	5	6	..	204
St. George-in-the-East	1	4	9	2	15	19	13	11	17	10	10	15	4	8	1	4	3	6	6	7	15	11	10	14	2	4	2	6	3	4	..	236
Limehouse	2	4	7	7	6	8	9	13	7	9	10	8	6	6	3	7	4	5	6	4	18	20	9	14	4	6	4	2	3	11	4	226
Mile End	5	2	13	2	9	18	16	12	21	22	8	16	8	9	7	8	4	5	7	9	17	22	13	15	16	20	6	8	6	16	2	342
Poplar	9	10	28	24	32	39	27	43	46	35	43	32	21	49	21	30	20	21	16	15	67	71	45	69	47	62	23	33	37	88	4	1107
St. Saviour, Southwark	..	2	5	3	4	1	1	3	..	3	4	2	3	1	..	4	3	1	2	2	4	3	2	7	3	1	2	3	5	6	3	83
St. George, Southwark	..	3	2	4	5	6	7	8	1	3	4	7	4	5	3	4	1	3	2	1	13	12	7	9	4	10	4	7	8	21	6	174
Newington	7	2	6	8	16	11	19	15	21	19	19	13	14	21	11	18	8	8	6	10	18	29	21	15	13	23	11	16	16	30	5	454
St. Olave, Southwark	.	..	2	..	2	..	1	2	..	3	..	..	..	1	1	..	..	..	..	..	..	1	..	3	2	6	1	..	1	2	..	23
Bermondsey	5	1	15	7	4	6	15	18	7	11	11	8	5	11	1	8	2	2	2	4	2	9	5	6	6	9	2	8	5	11	3	209
Rotherhithe	2	2	3	2	4	3	7	3	3	5	5	4	3	3	1	5	..	1	3	2	8	4	3	3	3	1	5	..	3	10	..	101
Lambeth	14	6	12	14	23	11	23	25	17	28	18	17	18	20	8	12	4	8	7	9	40	39	20	33	13	33	16	20	17	34	210	769
Battersea	3	2	12	8	16	22	23	27	41	29	27	25	27	22	22	15	20	12	8	8	29	49	23	31	9	14	12	17	23	44	1	621
Wandsworth	4	2	11	6	13	8	16	9	20	11	11	23	11	19	12	12	3	19	5	11	21	33	8	21	8	17	6	17	17	23	10	407
Camberwell	2	8	14	14	10	23	20	20	18	22	24	17	13	17	7	13	10	4	6	14	27	35	20	22	13	17	9	16	19	31	7	492
Greenwich	4	2	20	12	20	14	16	18	18	22	18	17	12	15	11	9	7	11	12	16	32	37	6	21	18	12	13	12	23	18	2	468
Lewisham	2	1	1	2	8	4	4	5	8	10	7	10	4	10	4	4	5	6	4	3	15	12	2	11	7	9	6	9	9	12	7	201
Woolwich	..	..	2	..	1	..	1	1	3	1	2	..	2	1	..	3	..	1	..	1	2	1	..	..	..	..	1	1	1	1	..	26
Plumstead	2	1	4	3	16	11	7	10	11	9	13	18	7	10	5	7	5	4	2	2	14	18	6	3	3	5	1	3	4	10	1	215
Port of London	..		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	118	113	378	288	449	437	513	531	520	545	490	493	351	475	261	345	230	257	169	233	658	844	444	639	346	559	252	422	454	810	400	13024

TABLE XXXVII.—THE NOTIFICATIONS OF DIPHTHERIA IN EACH SANITARY AREA IN LONDON, FOR THE YEAR 1894, DISTRIBUTED ACCORDING TO AGE AND SEX.

	Under 1		1		2		3		4		5		6		7		8		9		10 to 15		15 to 20		20 to 25		25 to 30		30 and upwards		Unrecorded.	TOTAL.
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Kensington	4	2	8	10	12	6	17	7	13	9	7	11	11	12	12	7	9	6	3	6	12	13	9	9	5	13	2	9	4	17	3	268
Fulham	5	3	9	9	19	7	19	20	16	14	14	18	14	17	15	16	6	6	10	10	11	25	3	8	3	8	5	4	6	10	..	330
Hammersmith	2	..	6	2	6	4	7	15	12	10	6	8	5	7	6	7	4	3	4	2	5	9	8	11	2	7	3	5	3	8	2	179
Paddington	2	3	15	7	9	13	17	24	23	21	13	16	12	20	11	16	3	17	11	4	14	23	6	7	4	13	5	12	10	14	5	370
Chelsea	1	..	9	2	11	11	12	17	11	12	11	8	15	12	8	11	4	6	6	6	10	19	4	6	2	7	1	4	8	7	4	245
St. George's, Hanover-sq.	2	2	5	..	2	6	2	2	5	4	3	1	4	1	6	4	2	..	2	1	3	7	..	4	..	4	1	2	2	10	15	102
Westminster	..	1	4	2	3	4	5	3	5	5	4	1	4	2	..	6	1	3	1	..	3	1	1	2	1	..	1	1	1	6	2	73
St. James, Westminster	..	..	1	2	..	1	3	1	1	2	..	4	1	5	..	2	1	..	..	..	2	1	..	2	3	1	1	..	1	5		40
Marylebone	2	2	12	8	12	9	9	15	10	9	14	21	7	10	8	6	2	4	1	7	17	17	9	14	4	9	6	6	4	15	3	272
Hampstead	1	..	3	1	1	7	8	4	3	3	3	2	3	1	..	2	..	1	1	3	3	1	6	4	3	9	4	4	6	7	..	94
St. Pancras	3	1	9	17	21	19	40	21	18	31	32	29	22	39	17	8	8	8	8	5	21	27	9	15	6	15	5	8	15	22	5	504
Islington	7	6	15	11	33	33	52	48	50	38	40	47	35	38	16	36	19	21	12	15	47	58	21	28	9	26	10	21	13	42	8	855
Hackney	4	5	13	11	18	22	30	28	29	22	20	38	20	28	18	20	9	11	7	14	30	55	12	31	19	25	7	11	19	24	1	601
St. Giles'	..	..	2	2	2	4	3	3	2	1	..	2	2	..	..	2	..	2	1	..	1	1	1	..	2	2	1	..	1	5	..	42
St. Martin-in-the Fields	..	..	..	2	..	1	..	2	..	3	1	..	1	..	..	.	..	.	..	..	1	..	1	1	..	..	1	..	1	..	..	15
Strand	1	1	..	2	1	3	1	..	2	1	1	1	1	1	..	1	1	..	..	..	1	1	..	1	1	..	..	3	3	.	..	27
Holborn	2	2	4	..	5	2	8	4	1	2	1	2	2	1	3	1	..	..	..	..	2	2	..	1	2	2	1	2	1	4	9	57
Clerkenwell	3	2	8	5	6	6	9	6	13	11	3	6	6	6	4	6	2	1	2	2	6	14	2	5	1	5	..	1	2	6	2	151
St. Luke	2	.	4	4	1	1	3	4	1	3	1	1	3	3	2	2	..	..	..	2	4	5	1	2	1	4	..	2	1	..	..	57
City of London	..	..	2	2	..	3	1	4	2	..	2	1	1	2	..	2	..	3	2	1	2	2	3	3	..	1	..	..	..	1	..	40
Shoreditch	5	5	14	17	9	12	14	14	14	11	8	17	8	12	5	6	4	10	7	7	11	16	10	12	7	7	9	7	2	4	1	285
Bethnal Green	5	4	18	11	15	22	24	30	21	28	28	25	15	22	6	16	4	11	10	6	30	31	15	19	5	20	9	17	13	24	4	508
Whitechapel	7	..	14	7	11	17	14	10	8	8	8	5	6	4	2	4	3	1	..	1	3	8	4	3	2	3	1	6	3	5	..	168
St. George-in-the-East	3	1	8	12	9	8	13	10	11	14	4	14	9	8	5	3	7	3	2	1	10	12	4	7	..	6	2	2	2	7	..	197
Limehouse	3	.	6	4	7	7	10	15	3	17	2	6	4	4	5	7	2	3	2	4	15	14	6	8	2	6	4	3	6	6	1	182
Mile End	4	3	7	11	10	22	17	18	15	16	13	16	7	18	6	14	5	12	5	6	14	25	8	14	4	8	6	5	4	13	3	329
Poplar	10	5	12	18	18	24	18	33	23	25	25	23	15	23	11	13	8	14	14	9	29	53	25	36	23	30	12	12	20	54	2	637
St. Saviour, Southwark	1	..	..	4	4	3	6	2	2	5	5	3	3	1	2	4	..	1	..	..	6	9	1	7	..	4	1	1	1	4	2	82
St. George, Southwark	2	2	10	3	8	4	7	7	3	9	6	8	6	5	8	1	3	9	2	5	15	13	3	4	4	8	2	2	4	12	2	177
Newington	3	2	11	11	10	13	13	12	11	17	7	10	4	14	7	5	3	11	6	4	15	29	7	10	7	12	5	11	7	21	..	298
St. Olave, Southwark	3	..	2	2	3	..	..	1	1	..	1	..	..	..	1	1	..	..	..	..	..	1	1	..	..	5	..	3	..	1	1	27
Bermondsey	4	3	10	7	10	8	17	16	15	11	8	10	9	13	8	13	6	7	5	8	17	17	3	3	1	7	2	7	7	7	1	260
Rotherhithe	1	3	5	3	2	2	9	10	6	4	4	7	7	5	5	6	5	1	4	6	10	5	4	7	3	1	2	4	3	8	1	143
Lambeth	5	3	15	13	22	30	18	24	24	27	27	28	14	21	12	19	12	6	9	8	26	38	13	19	10	15	3	13	13	31	70	588
Battersea	2	4	16	16	12	13	27	27	15	11	27	24	15	16	7	13	12	9	12	9	33	41	10	17	5	13	8	16	13	26	..	469
Wandsworth	2	3	7	7	16	13	12	16	13	13	13	17	8	18	7	14	12	5	8	10	20	20	10	12	2	11	2	16	10	11	4	332
Camberwell	6	10	28	19	21	30	37	26	22	32	36	32	31	24	15	24	15	29	8	13	35	42	13	20	15	22	8	16	15	36	9	692
Greenwich	11	9	8	23	34	19	16	24	30	31	26	33	13	22	14	14	12	10	10	15	30	39	15	15	4	19	9	21	11	17	..	554
Lewisham	4	..	1	3	10	2	3	11	7	11	4	3	4	7	4	3	1	4	5	5	6	14	1	6	5	4	..	6	6	9	..	149
Woolwich	1	..	1	2	3	1	5	2	3	4	3	5	1	1	1	2	..	1	..	..	2	2	1	1	1	2	1	3	1	..	..	50
Plumstead	1	2	3	7	3	9	6	12	7	8	4	13	3	4	8	12	3	3	3	1	9	12	1	1	3	4	1	1	7	3	1	155
Port of London	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	1	1	1	5
	124	89	325	299	399	421	532	548	471	503	435	516	351	447	265	349	188	242	183	196	531	722	253	375	171	358	141	267	253	503	162	10619

TABLE XXXVIII.—THE NOTIFICATIONS OF DIPHTHERIA IN EACH SANITARY AREA IN LONDON, FOR THE YEAR 1895, DISTRIBUTED ACCORDING TO AGE AND SEX.

	Under 1		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15 to 20		20 to 25		25 to 30		30 and upwards		Unrecorded.	Total.
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Kensington	5	2	10	17	17	15	17	27	18	23	13	21	13	14	10	11	4	7	10	6	5	6	2	2	5	6	2	5	2	2	5	15	2	14	2	8	5	19	..	367
Fulham	3	..	12	13	15	8	34	19	22	20	13	17	23	15	18	18	10	5	7	8	6	6	2	4	2	4	1	2	1	3	9	10	5	7	4	9	10	13	..	378
Hammersmith	4	2	5	3	12	4	5	15	9	11	10	10	6	8	3	8	7	6	4	3	4	3	1	3	2	5	..	2	1	3	2	12	2	5	2	3	2	10	2	199
Paddington	4	..	6	5	7	8	11	9	12	11	8	14	7	10	5	6	10	4	4	6	2	4	3	2	2	7	1	1	2	4	5	7	5	9	7	5	4	8	4	229
Chelsea	5	3	9	6	13	3	18	17	16	15	10	15	9	13	6	5	13	8	9	10	6	6	2	5	1	1	3	4	1	4	6	10	3	5	4	8	9	21	3	305
St. George, Hanover Sq.	1	..	2	2	1	2	3	7	8	7	7	7	2	4	2	3	3	4	1	..	..	1	..	2	..	..	..	..	1	..	..	2	..	1	1	5	4	4	4	91
Westminster	3	2	8	2	3	2	7	8	5	4	3	4	6	7	1	6	2	..	3	1	2	..	..	2	..	..	..	2	1	..	4	6	2	4	1	1	1	..	..	103
St. James, Westminster	1	..	1	..	1	..	1	2	1	..	1	2	2	2	1	1	..	..	..	1	1	1	.	1	..	..	1	..	..	..	1	6	..	4	..	5	2	3	..	42
Marylebone	2	4	9	7	7	8	10	9	6	10	5	12	5	5	7	10	2	7	2	2	2	5	3	3	4	4	.	7	3	3	9	12	7	8	6	11	4	10	1	231
Hampstead	1	1	2	..	4	4	4	5	3	..	..	5	6	3	3	6	3	3	3	..	1	1	1	.	1	2	..	2	2	..	5	8	1	12	1	8	5	8	..	114
St. Pancras	7	9	20	12	20	23	24	24	15	36	37	24	18	22	14	19	17	13	9	8	11	4	5	9	3	8	3	5	2	4	12	21	7	22	6	14	11	14	5	537
Islington	11	9	17	22	29	17	33	33	28	31	21	24	14	21	14	16	13	20	5	12	7	13	6	6	10	6	4	5	3	8	10	21	8	20	7	13	8	26	6	577
Stoke Newington ..	1	..	..	1	2	2	3	3	2	4	4	1	..	3	1	4	..	1	2	2	1	..	..	1	..	1	..	1	.	3	..	5	3	3	..	..	2	1	..	57
Hackney	8	7	15	6	17	8	18	26	26	27	17	26	13	23	9	17	9	7	10	2	9	13	3	6	3	7	5	9	5	11	12	32	10	13	13	13	7	20	4	486
St. Giles	1	1	1	5	1	4	2	5	1	5	3	2	2	1	2	1	2	1	..	..	1	..	..	..	1	..	..	1	..	..	2	1	1	2	1	3	1	2	1	57
St. Martin-in-the-Fields	..	..	..	2	1	1	2	1	.	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	..	2	1	1	..	18
Strand	2	..	4	2	..	1	..	2	1	1	2	3	.	..	1	4	..	..	..	1	..	..	1	..	..	..	..	..	..	..	1	3	4	2	1	1	1	1	..	39
Holborn	..	..	3	3	3	2	4	5	1	2	..	2	1	3	1	..		..	3	.	2	1	..	..	..	1	..	..	1	..	4	..	1	2	..	1	2	..	5	53
Clerkenwell	4	1	6	4	8	6	7	6	6	5	4	5	3	7	3	5	3	..	1	1	2	2	..	4	1	2	..	4	1	2	4	4	1	6	1	6	..	128
St. Luke	5	.	2	3	9	4	3	1	3	5	3	4	5	1	3	3	2	2	3	2	..	1	..	1	..	1	1	..	1	..	1	5	3	3	2	2	4	2	..	90
City of London	2	1	2	1	2	2	2	1	..	..	..	..	3	..	2	..	..	.	1	..	1	..		..	1	1	1	..	2	..	6	2	1	4	..	4	..	1	..	43
Shoreditch	5	2	14	4	9	10	7	18	8	14	8	18	7	13	8	4	5	5	2	2	2	2	2	2	3	4	2	2	3	4	7	16	1	8	2	4	2	4	..	233
Bethnal Green	6	2	18	14	23	19	19	31	22	18	7	12	11	16	8	9	6	10	6	8	6	8	5	9	3	7	3	3	3	6	19	24	9	12	7	16	10	20	1	436
Whitechapel	7	4	19	14	20	9	16	25	18	13	14	7	5	7	5	6	3	4	2	1	4	3	..	3	2	2	1	3	3	4	4	6	3	9	6	9	5	9	..	275
St. George-in-the-East	4	5	16	9	15	13	9	13	6	7	5	11	10	5	5	10	7	3	5	5	6	4	..	2	1	1	1	4	1	5	5	11	1	1	4	2	1	6	..	215
Limehouse	4	1	12	5	10	6	9	7	6	3	10	9	7	10	4	7	3	7	5	2	3	3	2	3	3	4	1	3	2	2	2	11	4	4	..	2	4	5	..	185
Mile End	6	6	18	13	18	16	28	25	29	21	24	16	11	15	13	18	9	12	9	12	6	7	8	9	4	5	1	3	10	5	15	22	5	14	5	5	11	14	2	470
Poplar	9	5	14	24	22	30	36	24	38	36	29	30	31	31	18	18	11	16	11	10	6	15	9	16	5	10	12	12	6	6	20	39	15	25	8	23	15	38	10	732
St. Saviour's, Southwark	..	1	2	3	1	3	2	2	3	6	2	3	1	1	5	2	..	2	2	..	1	..	1	..	1	2	2	.	2	..	3	7	..	1	1	..	..	3	..	65
St. George, Southwark ..	..	..	4	2	3	6	11	8	4	7	3	3	2	5	6	3	1	2	3	...	1	..	1	3	..	2	1	1	..	2	4	3	1	2	2	..	..	4	1	101
Newington	3	4	9	8	9	3	8	14	14	15	9	17	10	9	7	5	3	2	1	4	2	9	4	1	3	2	3	2	3	4	10	17	6	11	2	13	5	9	2	262
St. Olave's	..	1	..	3	2	2	1	1	..	2	..	1	..	..	..	..	..	..	.		..	1	..	1	..	1	..	1	..	1	..	1	1	1	..	1	..	..	..	22
Bermondsey	3	..	3	2	6	8	8	3	5	8	4	1	4	1	3	1	1	3	3	1	..	2		..	2	..	1	1	1	4	2	2	2	2	2	4	8	..	109
Rotherhithe .. .	1	3	3	6	4	6	4	7	3	11	5	6	6	6	..	3	7	1	4	2	3	4	1	2	1	1	3	3	1	1	6	8	..	..	1	1	2	9	..	135
Lambeth	6	2	19	18	30	24	27	19	33	36	21	31	18	22	22	17	7	14	11	13	7	13	9	8	4	9	6	5	6	6	20	23	15	24	5	12	13	28	28	631
Battersea	6	4	8	11	23	12	14	17	20	11	18	19	11	14	8	9	8	6	8	8	5	6	5	7	3	2	4	3	2	5	10	15	4	13	4	14	6	20	..	363
Wandsworth	4	2	13	2	5	10	16	15	13	9	13	4	11	10	9	10	6	7	4	4	3	6	4	2	1	5	3	3	4	1	8	15	3	10	4	4	6	13	3	265
Camberwell	9	9	31	23	26	30	43	50	37	45	47	41	34	41	27	31	26	23	18	19	15	23	12	15	13	9	15	10	9	4	17	32	8	24	10	15	11	33	4	889
Greenwich	6	7	30	30	32	39	51	40	56	39	36	53	28	38	32	27	18	25	13	12	17	20	18	12	10	12	6	12	9	8	17	25	3	19	10	10	14	29	1	864
Lewisham	1	1	..	4	2	3	3	3	4	4	9	2	5	8	3	4	3	4	5	3	2	2	1	3	1	3	1	4	1	2	7	5	2	4	1	5	3	2	5	125
Woolwich	1	1	3	3	3	5	4	1	3	3	4	4	3	5	1	1	2	2	..	1	..	1	1	1	..	1	..	1	..	1	1	4	..	2	2	..	..	2	..	67
Plumstead	1	1	7	3	8	3	5	7	5	7	9	8	11	5	3	3	6	3	4	3	2	2	1	1	1	3	..	..	3	1	3	6	3	1	1	2	1	1	..	134
Lee	..	..	..	..	2	1	4	3	2	4	..	1	4	3	1	3	1	4	1	..	..	2	..	..	1	1	..	..	1	1	1	1	..	2	..	..	..	2	..	46
Port of London	..	..	..	..	..		.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		1	.	..	..	2	1	..	..	..	..	..	.	..	4
	152	103	377	317	445	382	533	563	510	533	443	498	365	430	292	336	233	241	194	177	155	198	115	151	96	144	90	122	103	112	279	476	156	335	136	262	197	429	92	10772



ETIOLOGY OF DIPHTHERIA (KLEIN.)

FIGS. 1, 2, and 3. Reproduced from photographs of stained cover-glass specimens of material from cultures on AGAR of the diphtheria bacillus from a human source. (X. 1000.)

FIG. 4. Reproduced from a photograph of the diphtheria bacillus from a GELATINE culture derived from the necrotic tissue of a tumour, locally induced in a cow by inoculation of bacillus diphtheriæ from a human source. (X. 1000.)

FIG. 5. Colony ON THE SURFACE (slanting) of nutrient GELATINE of the diphtheria bacillus directly derived from fresh diphtheria membrane of the human subject, after two weeks' incubation at 20·5° C. (Natural size.)

GEOGRAPHICAL DISTRIBUTION OF DIPHTHERIA MORTALITY IN ENGLAND AND WALES, 1861-1870.

The average rate in England and Wales was 0·18 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of yellow indicating *excess* of diphtheria, and shades of blue *comparative freedom* from diphtheria.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent. . . . .
,, 70 to 90 ,, ...
,, 90 to 110 ,, ...

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,, ...
Exceeding 150 ,, ...

GEOGRAPHICAL DISTRIBUTION OF DIPHTHERIA MORTALITY IN ENGLAND AND WALES, 1871-1880.

The average rate in England and Wales was 0·12 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of yellow indicating *excess* of diphtheria, and shades of blue *comparative freedom* from diphtheria.

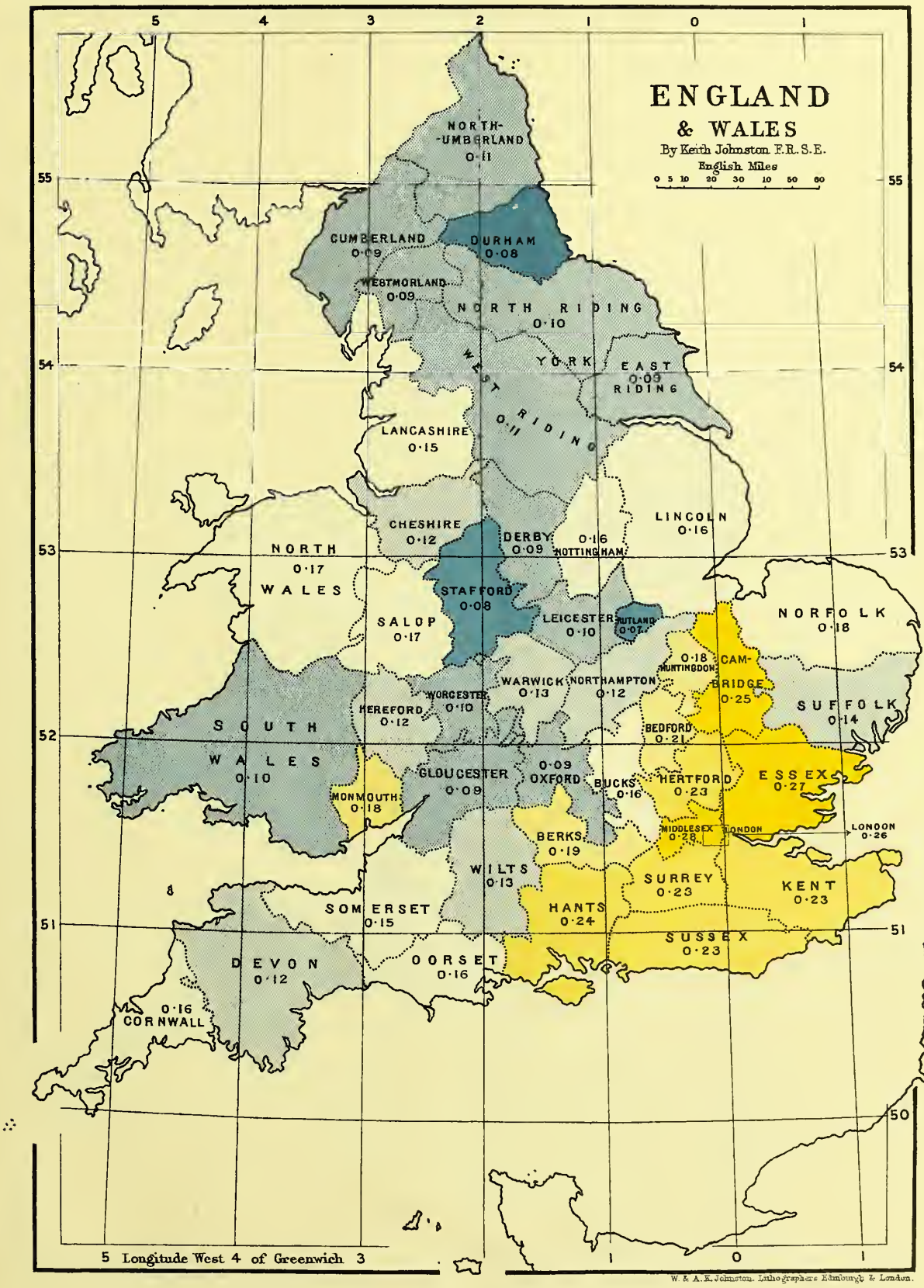
W. & A. K. Johnston, Lithographers Edinburgh & London.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

GEOGRAPHICAL DISTRIBUTION OF DIPHTHERIA MORTALITY IN ENGLAND AND WALES, 1881-1890.

The average rate in England and Wales was 0·16 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of yellow indicating *excess* of diphtheria, and shades of blue *comparative freedom* from diphtheria.



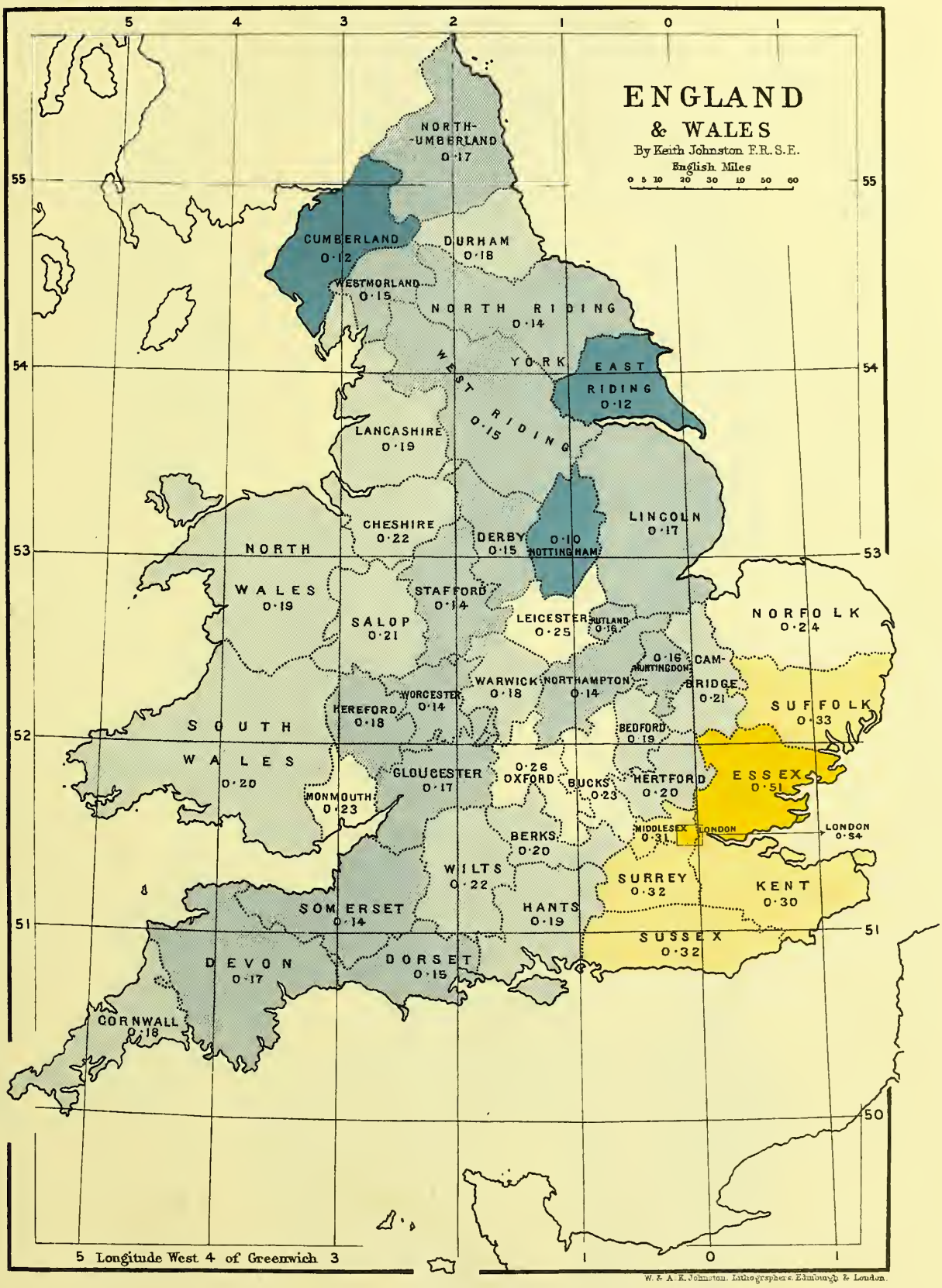
W. & A.K. Johnston, Lithographers Edinburgh & London.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

GEOGRAPHICAL DISTRIBUTION OF DIPHTHERIA MORTALITY IN ENGLAND AND WALES, 1891-1895.

The average rate in England and Wales was 0·25 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of yellow indicating *excess* of diphtheria, and shades of blue *comparative freedom* from diphtheria.



Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent. . . . . .
,, 70 to 90 ,, ...
,, 90 to 110 ,, ...

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,, ...
Exceeding 150 ,, ...

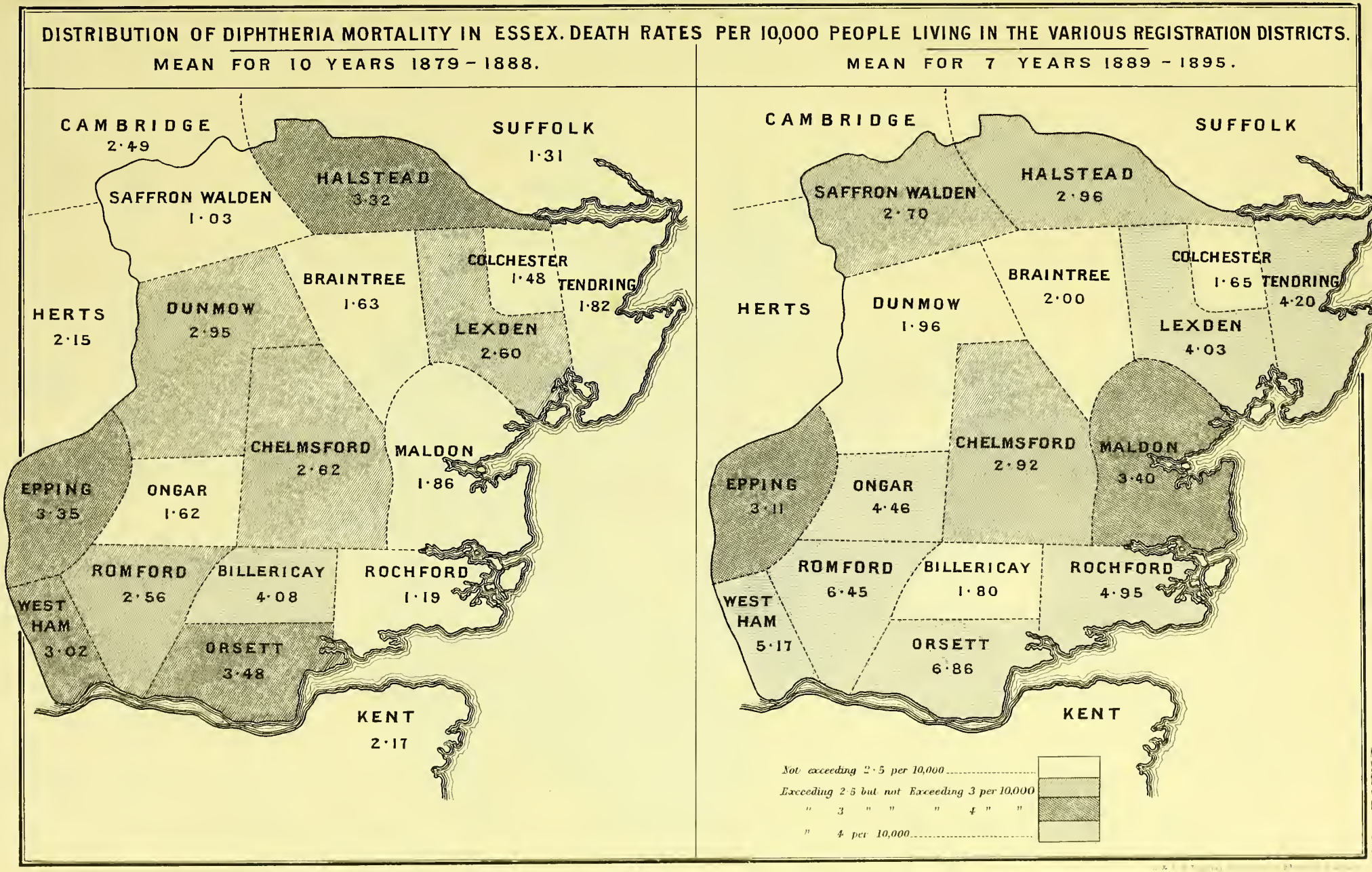
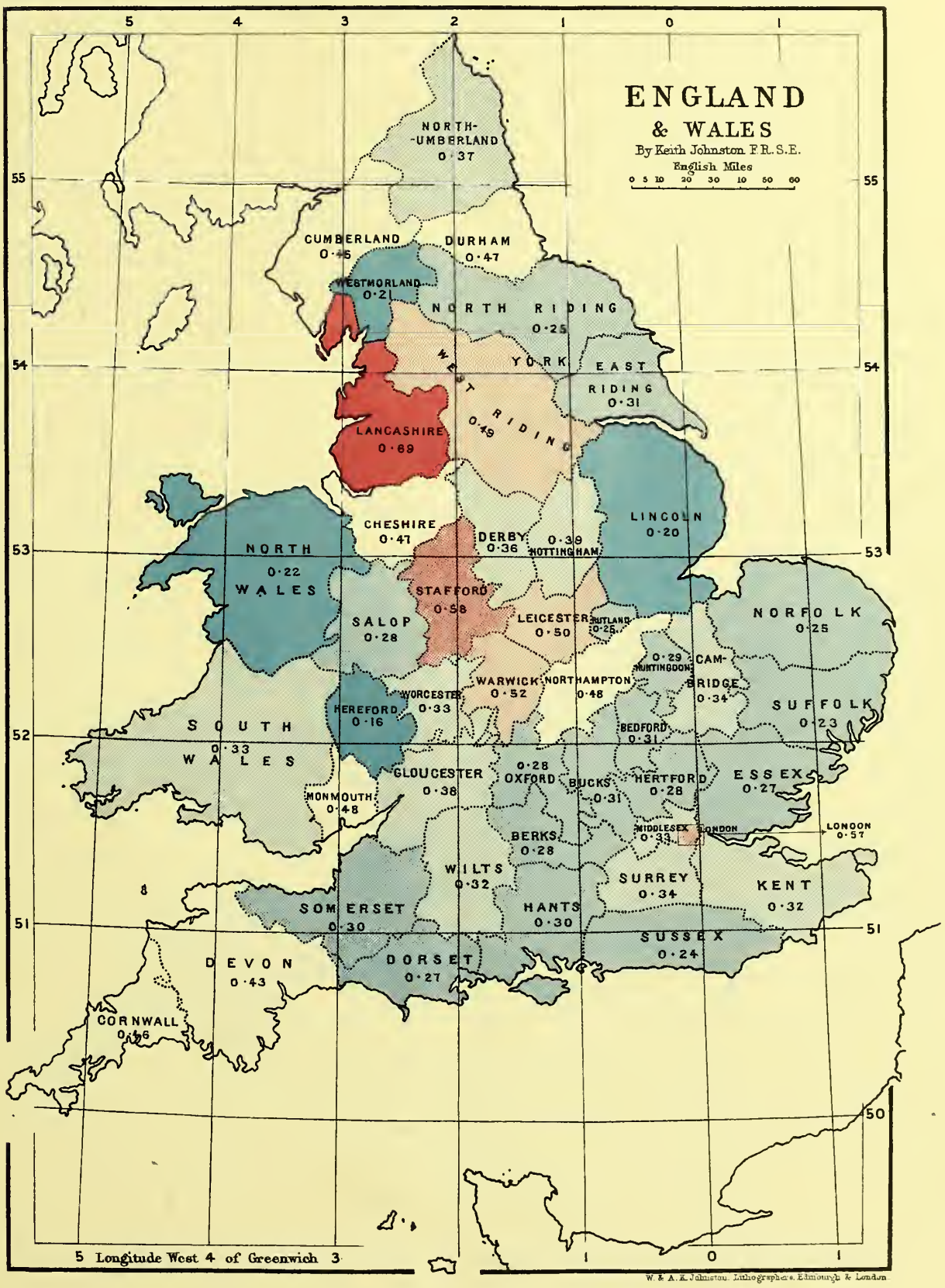

DISTRIBUTION OF DIPHTHERIA MORTALITY IN ESSEX. DEATH RATES PER 10,000 PEOPLE LIVING IN THE VARIOUS REGISTRATION DISTRICTS.
MEAN FOR 10 YEARS 1879 - 1888.
MEAN FOR 7 YEARS 1889 - 1895.
CAMBRIDGE 2·49
SUFFOLK 1·31
HALSTEAD 3·32
SAFFRON WALDEN 1·03
BRAINTREE 1·63
COLCHESTER 1·48
TENDRING 1·82
HERTS 2·15
DUNMOW 2·95
LEXDEN 2·60
CHELMSFORD 2·62
MALDON 1·86
EPPING 3·35
ONGAR 1·62
ROMFORD 2·56
BILLERICAY 4·08
ROCHFORD 1·19
WEST HAM 3·02
ORSETT 3·48
KENT 2·17
CAMBRIDGE
SUFFOLK
HALSTEAD 2·96
SAFFRON WALDEN 2·70
BRAINTREE 2·00
COLCHESTER 1·65
TENDRING 4·20
HERTS
DUNMOW 1·96
LEXDEN 4·03
CHELMSFORD 2·92
MALDON 3·40
EPPING 3·11
ONGAR 4·46
ROMFORD 6·45
BILLERICAY 1·80
ROCHFORD 4·95
WEST HAM 5·17
ORSETT 6·86
KENT
Not exceeding 2·5 per 10,000
Exceeding 2·5 but not Exceeding 3 per 10,000
" 3 " " " 4 " "
" 4 per 10,000

PLATE VI.

GEOGRAPHICAL DISTRIBUTION OF MEASLES MORTALITY IN ENGLAND AND WALES, 1861-1870.

The average rate in England and Wales was 0·44 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of crimson indicating *excess* of measles, and shades of blue *comparative freedom* from measles.

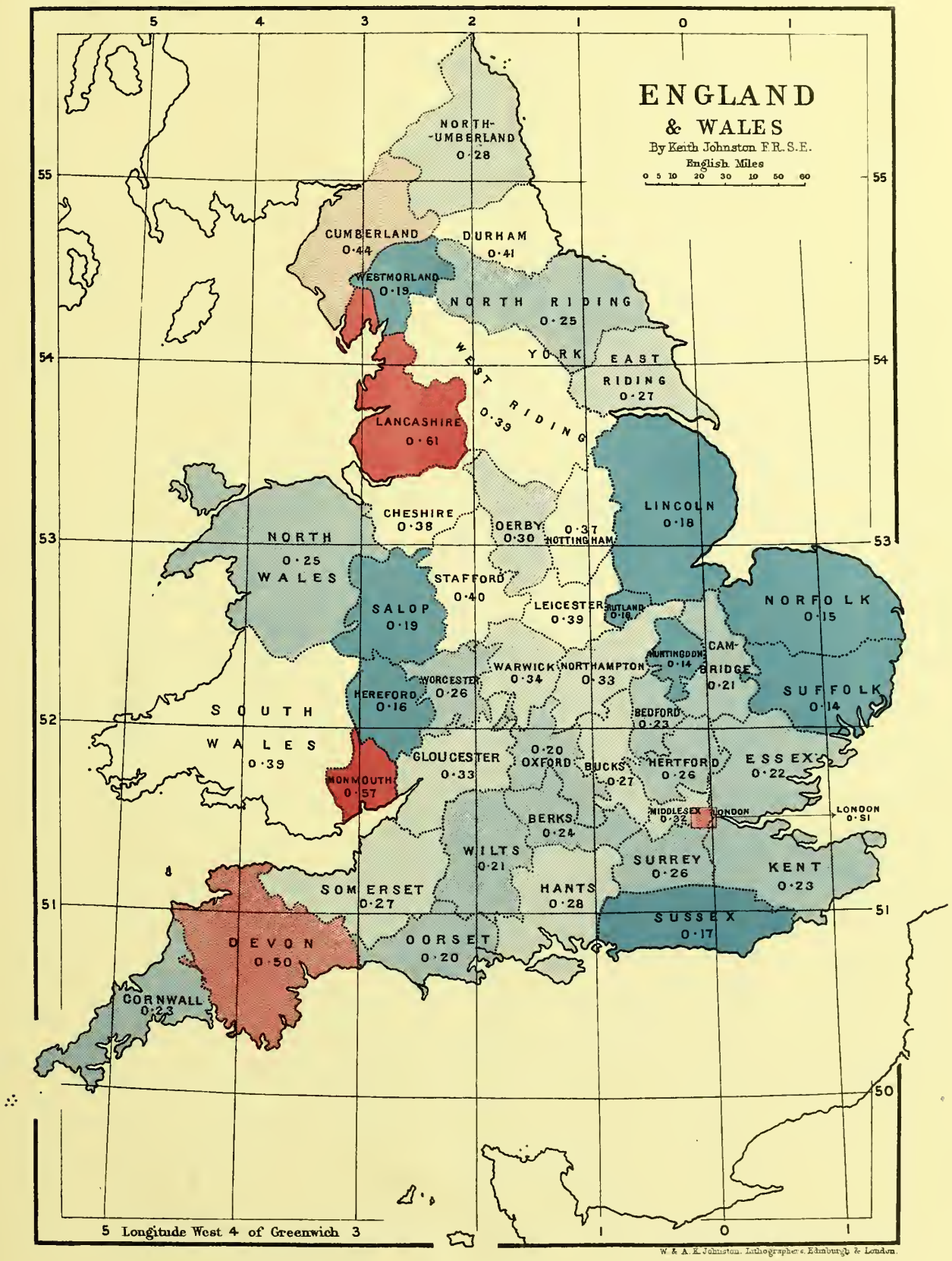


Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

GEOGRAPHICAL DISTRIBUTION OF MEASLES MORTALITY IN ENGLAND AND WALES, 1871-1880.

The average rate in England and Wales was 0·38 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of crimson indicating *excess* of measles, and shades of blue *comparative freedom* from measles.



Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent. . . . .
,, 70 to 90 ,, ...
,, 90 to 110 ,, ...

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,, ...
Exceeding 150 ,, ...

PLATE IX.

GEOGRAPHICAL DISTRIBUTION OF MEASLES MORTALITY IN ENGLAND AND WALES, 1881-1890.

The average rate in England and Wales was 0·44 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of crimson indicating *excess* of measles, and shades of blue *comparative freedom* from measles.

W. & A.K. Johnston, Lithographers, Edinburgh & London.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

GEOGRAPHICAL DISTRIBUTION OF MEASLES MORTALITY IN ENGLAND AND WALES, 1891-1895.

The average rate in England and Wales was 0·41 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of crimson indicating *excess* of measles, and shades of blue *comparative freedom* from measles.

W. & A. K. Johnston, Lithographers, Edinburgh & London.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,
From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

GEOGRAPHICAL DISTRIBUTION OF SCARLET FEVER MORTALITY IN ENGLAND AND WALES, 1861-1870.

The average rate in England and Wales was 0·97 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of scarlet indicating *excess* of scarlet fever, and shades of blue *comparative freedom* from scarlet fever.

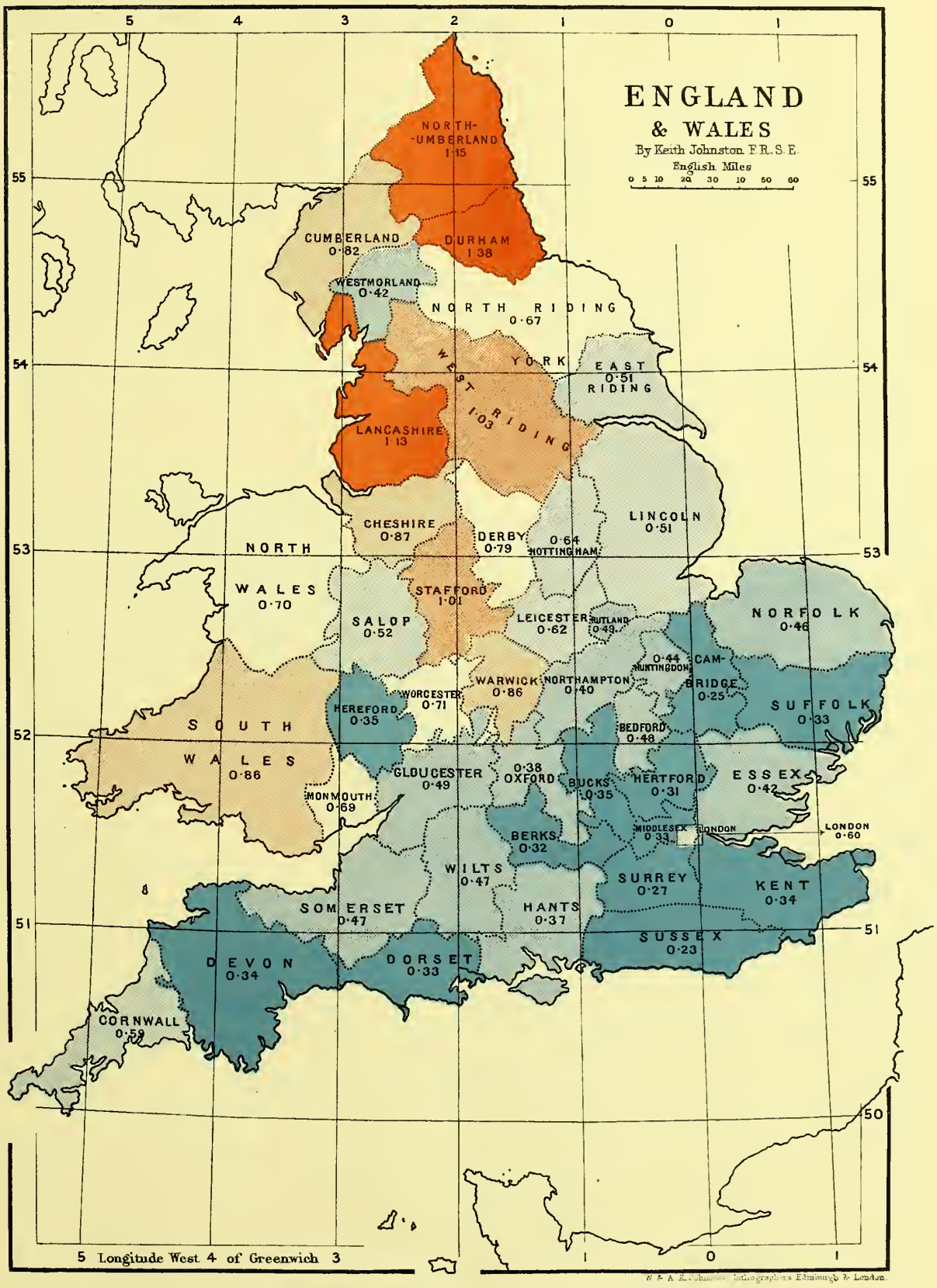
W. & A. K. Johnston, Lithographers, Edinburgh & London.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

GEOGRAPHICAL DISTRIBUTION OF SCARLET FEVER MORTALITY IN ENGLAND AND WALES, 1871-1880.

The average rate in England and Wales was 0·72 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of scarlet indicating *excess* of scarlet fever, and shades of blue *comparative freedom* from scarlet fever.



W. & A. K. Johnston Lithographers Edinburgh & London.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

GEOGRAPHICAL DISTRIBUTION OF SCARLET FEVER MORTALITY IN ENGLAND AND WALES, 1881-1890.

The average rate in England and Wales was 0·33 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of scarlet indicating *excess* of scarlet fever, and shades of blue *comparative freedom* from scarlet fever.

W. & A.K. Johnston, Lithographers, Edinburgh & London.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

GEOGRAPHICAL DISTRIBUTION OF SCARLET FEVER MORTALITY IN ENGLAND AND WALES, 1891-1895.

The average rate in England and Wales was 0·18 per 1000.
The figures printed show the rates in the several counties; and counties whose rates differed *more than 10 per cent.* from the English rate are coloured according to their departure from this rate—shades of scarlet indicating *excess* of scarlet fever, and shades of blue *comparative freedom* from scarlet fever.

W. & A. K. Johnston, Lithographers, Edinburgh & London.

Rates not exceeding 50 per cent. of the English rate
From 50 to 70 per cent.
,, 70 to 90 ,,
,, 90 to 110 ,,

From 110 to 130 per cent. of the English rate
,, 130 to 150 ,,
Exceeding 150 ,,

Plate XV.

DIAGRAM 1.

Average numbers of children at each age under 10 years on the roll of the London Board Schools in the four years 1892-5.

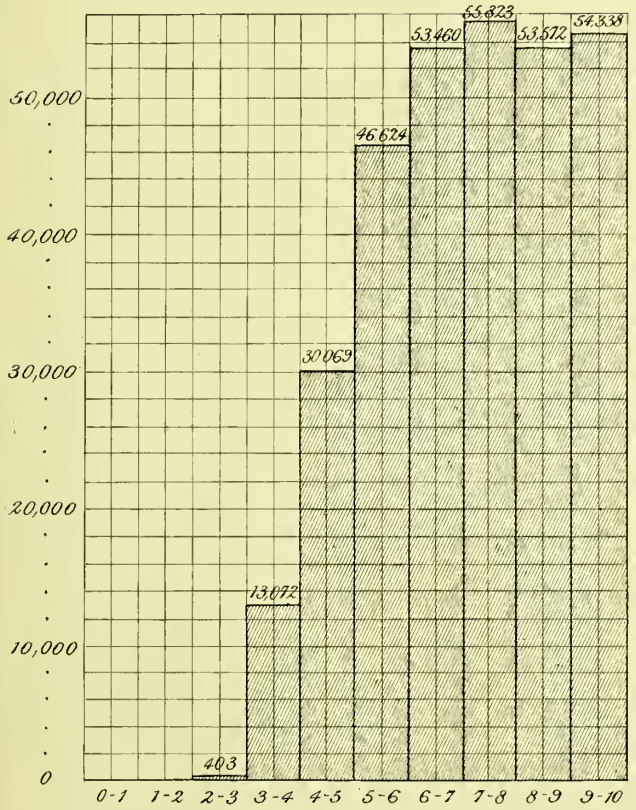


DIAGRAM 2.

Average Annual Notifications of Diphtheria in London at each age under 10 in the four years 1892-5.

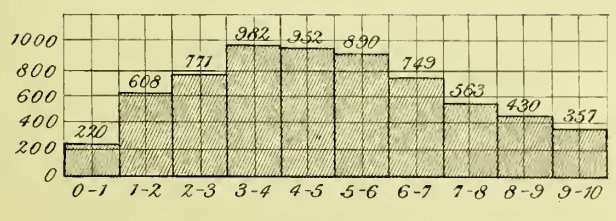


DIAGRAM 3.

At each age under 10 years, the number of children living in London, among whom ONE annual notification of Diphtheria occurs. The dark shaded parts of the columns show how many of the children are on the roll of the School Board.

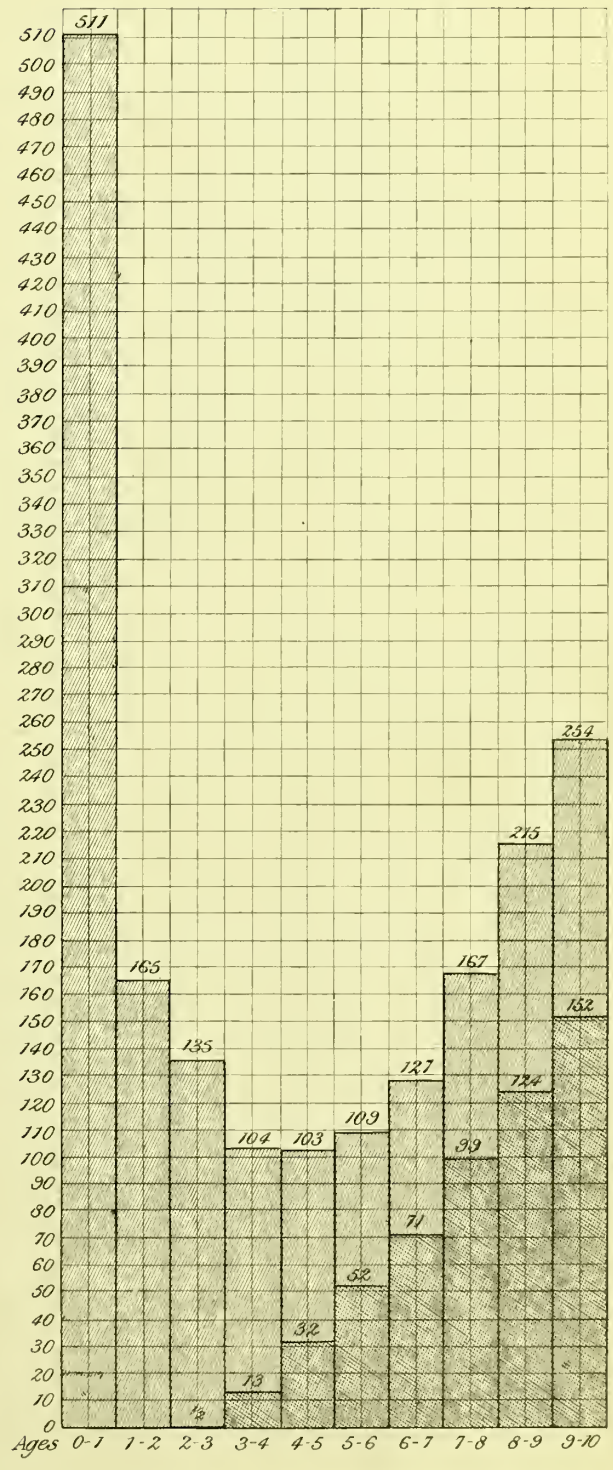


CHART 1.

Weekly Notifications of Cases of Diphtheria (excluding Membranous Croup) occurring in London in 1890.

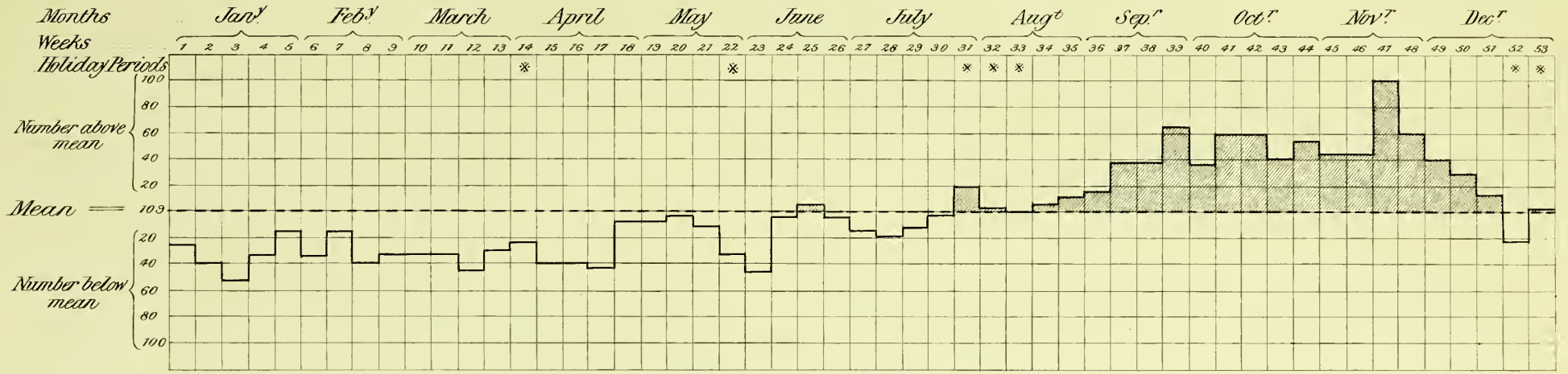
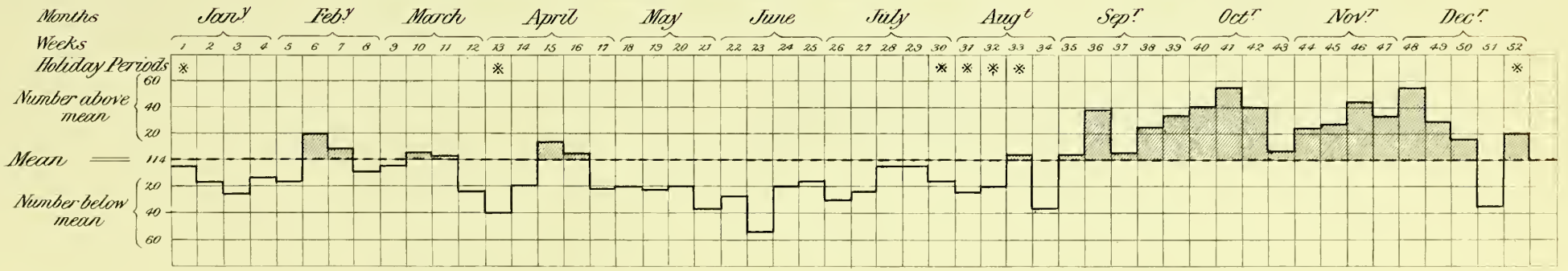


CHART 2.

Weekly Notifications of Cases of Diphtheria (excluding Membranous Croup) occurring in London in 1891.



* Holidays in Schools under the School Board for London.

CHART 3.

Weekly Notifications of Cases of Diphtheria (excluding Membranous Croup) occurring in London in 1892.

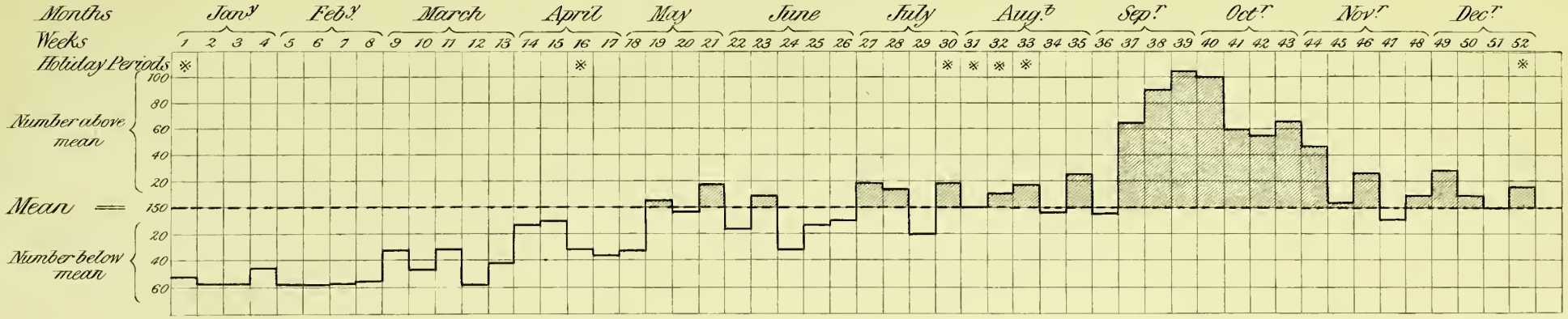
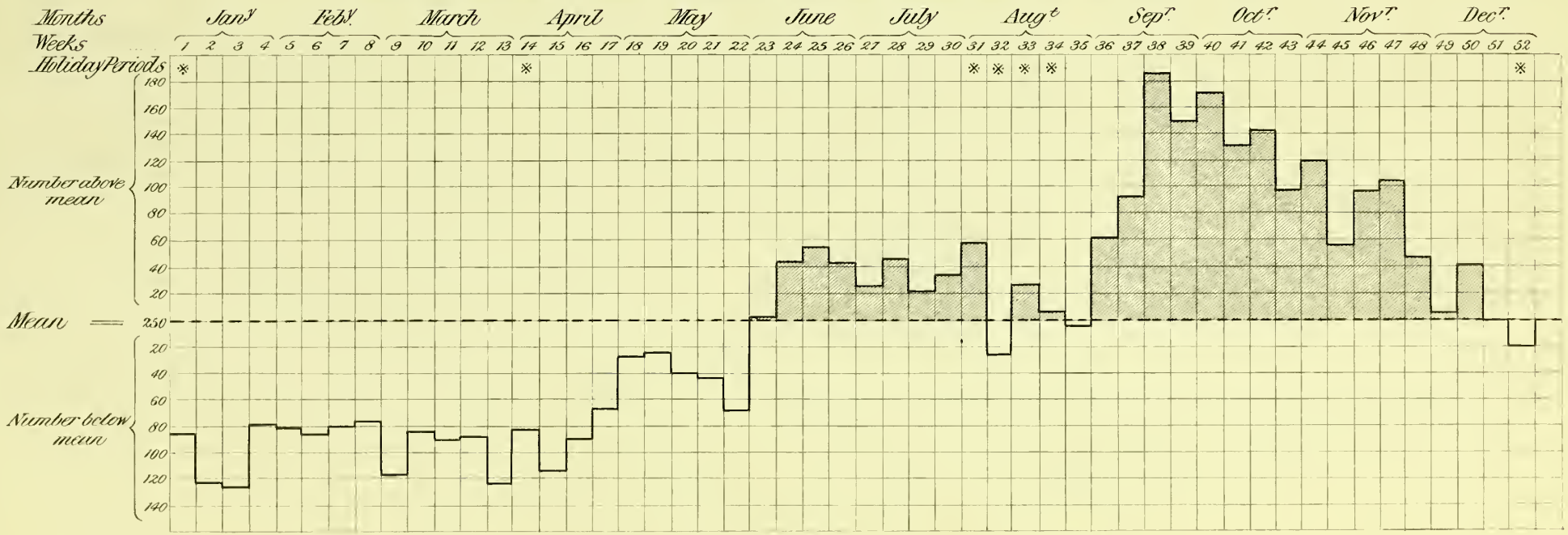


CHART 4.

Weekly Notifications of Cases of Diphtheria (excluding Membranous Croup) occurring in London in 1893



* Holidays in Schools under the School Board for London.

CHART 5.

Weekly Notifications of Cases of Diphtheria (excluding Membranous Croup) occurring in London in 1894.

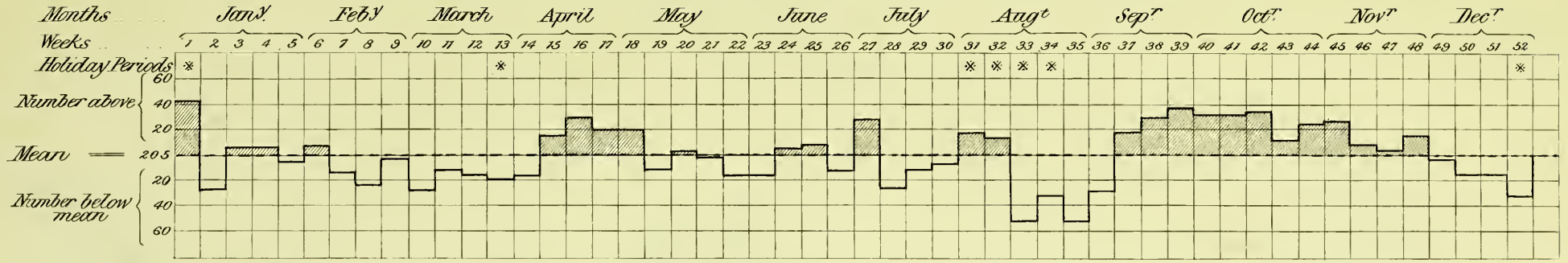
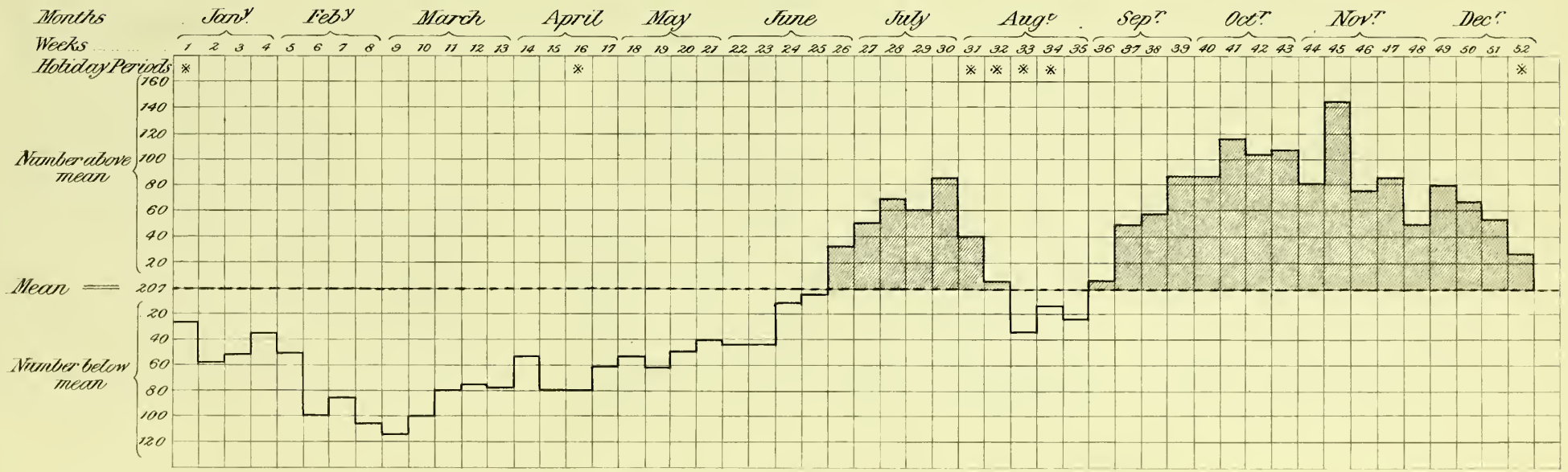


CHART 6.

Weekly Notifications of Cases of Diphtheria (excluding Membranous Croup) occurring in London in 1895



* Holidays in Schools under the School Board for London.

Diagrams showing the age, distribution of 1,000 deaths from Diphtheria occurring among children under 5 years of age, and also the average number at ages 5–10 in proportion to 1,000 deaths at 0–5.

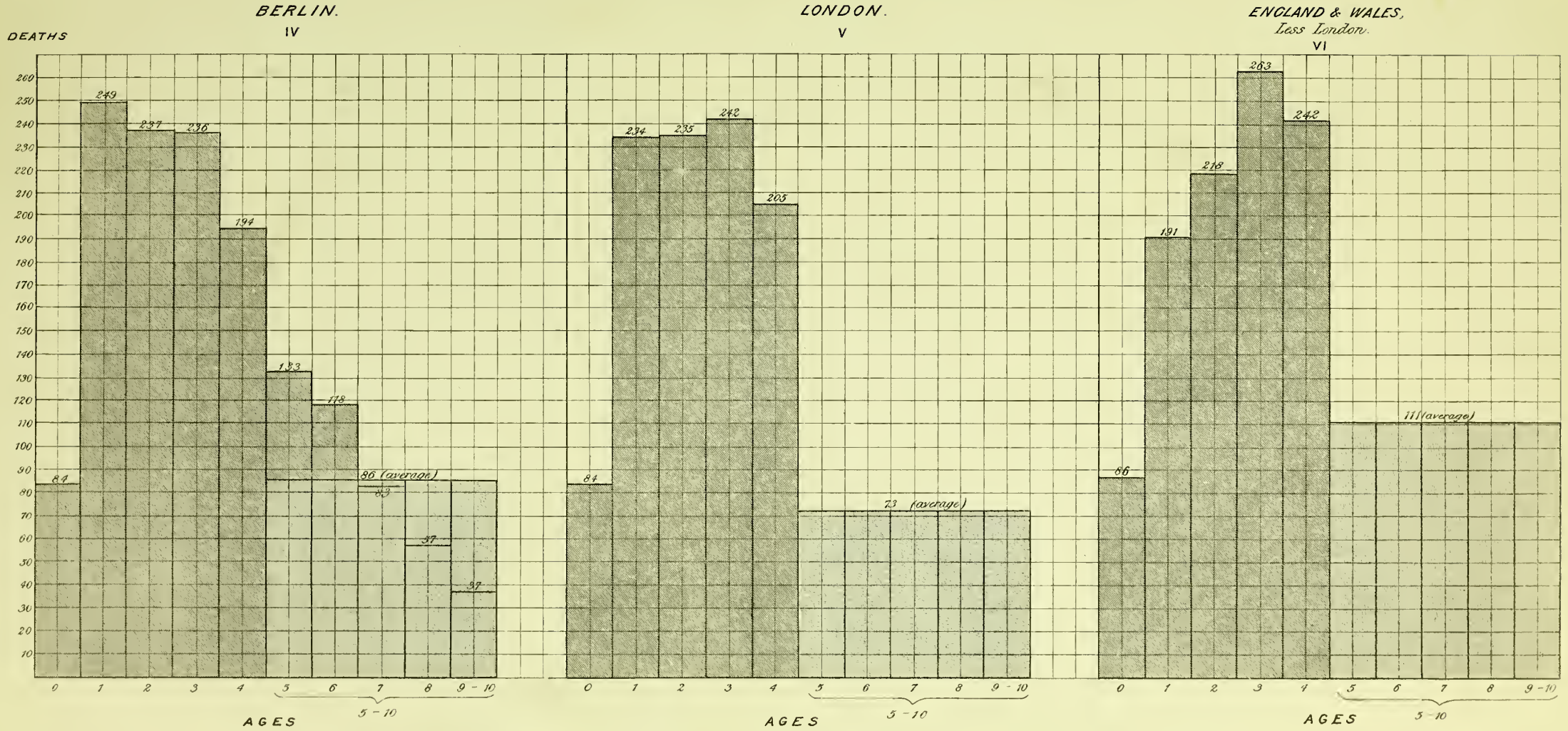


Plate XIX